MARCH 1939 SPECIAL B.I.F. NUMBER ONE SHILLING

RECEIVED
Patent Dept.
MAR 27 1939
The Dow Chemical Co.

Plastics

EALING WITH THE MANUFACTURE USES AND POTENTIALITIES OF PLASTIC MATERIALS

THE NEW INJECTION MOULDING MATERIAL

BEXONE

VINYL RESIN
INJECTION MOULDING POWDER

★ **Free Flowing**
★ **Excellent Colours**
★ **High Impact Strength**
★ **Good Finish**
★ **Low Specific Gravity 1.14—1.16**

Ask for Particulars—

BX PLASTICS LIMITED
HALE END, LONDON, E.4

SUBSIDIARY COMPANY OF
THE BRITISH XYLONITE CO., LTD.
MAKERS AND MANIPULATORS OF PLASTICS SINCE 1877

IF THOSE LIPS COULD ONLY SPEAK . . .

. . . they might tell of the infinite care, the scrupulous testing, that went to their manufacture. This plastic moulding — a detachable 'pouring lip'— is made in thousands by Ashdowns. If you are wondering whether plastic mouldings, large or small, could help solve your manufacturing problems, Ashdowns will spare no pains in research, advice, design and manufacture.

ASHDOWNS LTD.

HEAD OFFICE: ECCLESTON WORKS, ST. HELENS, LANCASHIRE. TELEGRAMS: "SEGMENT", ST. HELENS. PHONE: ST. HELENS 3206

PLASTICS PERFECT FASTENING

NOTE the double thread-cutting slot, which produces a sharp clean cut thread in any plastic material and assures easy driving.

cuts its own STANDARD MACHINE SCREW THREAD

CUTS OUT TAPPING

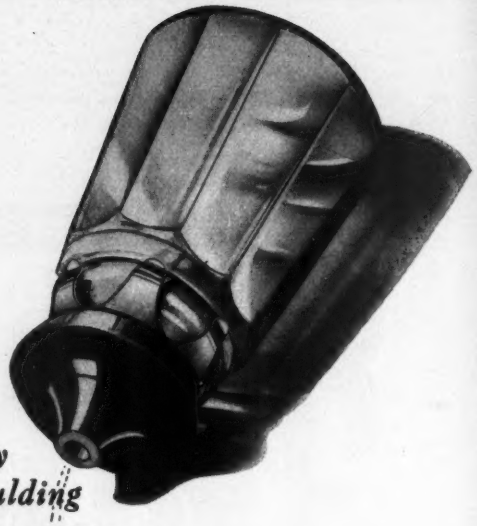
Tight and rigid fastenings in plastics can be made at much lower cost with the new Shakeproof Hi-Hook Thread-Cutting Screw. It taps and fastens in the same operation. A clean, sharp thread is obtained in any plastic material, because its double-slot design assures an acute cutting edge which drives easily, cleanly, and without fracture of the material. The fastening is tight, and should replacement ever be necessary, a standard machine screw of the same thread can be used. Reduce costs and speed up production by eliminating the cost of taps and the tapping operation. So that you can test this for yourself samples will be forwarded on request.

BRITISH PATENT Nos.
386,083 — 386,895 —
467,814 — 468,679 —
468,744—others pending.

SHAKEPROOF Hi-Hook **THREAD-CUTTING SCREWS**

MADE BY THE MANUFACTURERS OF THE SHAKEPROOF LOCK WASHER

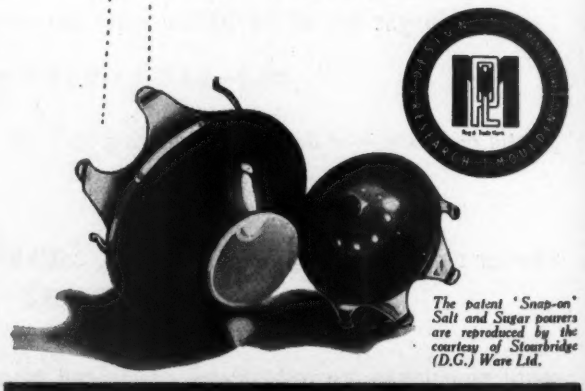
BARBER & COLMAN LTD. · MARSLAND ROAD · BROOKLANDS
MANCHESTER · TEL. SALE 2277 (2 LINES) · GRAMS. "BARCOL" SALE



Any moulding

LARGE *or* small

Everything comes alike to us whether it's a salt or sugar pourer or an extra large moulding say for the electrical trade. Moulding is our job and our specialised organisation of technicians, designers, mould makers and very modern moulding equipment enables us to offer perfect mouldings of every type, simple or intricate, large or small. They all receive the same careful and expert attention. That is why our mouldings are distinguished for their fine finish, strength and accuracy—and prices are always competitive. *We can help you as we are helping other manufacturers with their moulding problems. Write us, we will gladly send a technical representative to discuss mouldings with you without obligation.*



The patent 'Snap-on' Salt and Sugar pourers are reproduced by the courtesy of Stourbridge (D.G.) Ware Ltd.

Moulded Products Ltd

CHESTER RD · TYBURN · BIRMINGHAM

Longleys

THE NATIONAL SAVINGS SERVICE

* * *

HOLIDAY CLUBS

PROVIDENT SCHEMES

For twenty-three years the National Savings Committee has been assisting an ever-increasing number of employers to organise savings facilities for the benefit of their employees.

A facility now specially popular is the NATIONAL SAVINGS HOLIDAY CLUB. These Clubs can be used not only for personal saving by employees but, in addition, for the accumulation of Holiday Pay Allowances, where desired, by the employer.

The Committee has had wide experience in establishing on a business-like footing Share Out and other kinds of Saving Clubs.

For employers who wish to help their employees to make provision to meet special requirements in the future, such as marriage, retirement, or assistance to dependants in case of death, the Committee will be pleased to submit draft PROVIDENT SCHEMES specially drawn up to meet particular circumstances.

The Committee will always be glad to send an experienced representative to discuss your individual requirements and every assistance will be given in starting a scheme, including the provision of a speaker to address employees, and the preparation of a special explanatory letter for distribution. Membership cards, books, etc. are provided free.

Enquiries should be addressed to the
NATIONAL SAVINGS COMMITTEE
(Ref. V23 *),* **LONDON, S.W.1**

DIRECTORY OF THE INDUSTRY

ACCUMULATORS

	Telephone Nos.
BAKER PERKINS, LTD., Westwood Works, Peterborough	Peterborough 3201
BERRY, HENRY, & CO., LTD., Croydon Works, Hunslet, Leeds	Hunslet 75481-2
BRADLEY & TURTON, LTD., Caldwell Works, Kidderminster	Kidderminster 117
DANIELS, T. H. & J., LTD., Lightpill Iron Works, Stroud, Gloucester	Stroud 236-7
DAVY BROS., LTD., Park Iron Works, Sheffield	Sheffield 22161
SHAW, FRANCIS, & CO., LTD., Corbett Street, Manchester 11	Manchester East 1415-7

BITUMINOUS MOULDINGS

DE LA RUE, THOS., & CO., LTD., Telenduron Works, 90, Shernhall Street, Walthamstow, E.17	Walthamstow 2900
EBONESTOS INDUSTRIES, LTD., Excelsior Works, Rollins Street, Canterbury Road, S.E.15	New Cross 1913

BUYERS OF SCRAP MATERIALS

HARRIS, t ALFRED, & CO., LTD., Townshend Terrace, Richmond, Surrey	Richmond 2071

CASEIN

BRITISH LACTONITE CO., LTD., 89, Upper Thames Street, London, E.C.4	Mansion House 9220
BX PLASTICS, LTD., Hale End, London, E.4	Larkswood 2345
ERINOID, LTD., Lightpill Mills, Stroud, Gloucester	Stroud 510-1
GALALITH (LONDON) LTD., 9, Bridgewater Street, Barbican, London, E.C.1	National 3161
THOMSON, L., LTD., Mark Lane Station Buildings, London	Royal 6071-4
YORKSHIRE CASEIN MANUFACTURERS LTD., Bank Street, Wakefield	Wakefield 3375
YOUNG & WOLFE, Stonehouse, Gloucester	Stonehouse, Gloucester 243

CHEMICALS (RAW MATERIALS)

Cresol

BLAGDEN, VICTOR & CO., LTD., Coronation House, 4, Lloyd's Avenue, London, E.C.3	Royal 6382
MONSANTO CHEMICALS, LTD., Victoria Station House, Victoria Street, London, S.W.1	Victoria 1535
YORKSHIRE TAR DISTILLERS LTD., 49, Billiter Buildings, Billiter Street, London, E.C.3	Royal 2319

Formaldehyde and Hexamine

BARTER TRADING CORP., LTD., 14, Waterloo Place, London, S.W.1	Whitehall 1301
BLAGDEN, VICTOR & CO., LTD., Coronation House, 4, Lloyd's Avenue, London, E.C.3	Royal 6382
BRITISH INDUSTRIAL PLASTICS, LTD., Ideal House, 1, Argyll Street, London, W.1	Gerrard 7278
GREEFF, R. W., & CO., LTD., Thames House, Queen Street Place, London, E.C.4	Central 6550
HOWARDS & SONS, LTD., Ilford, London	Ilford 1113
SYNTHITE LTD., Ryders Green, West Bromwich	Tipton 1261-2

Phenol

BLAGDEN, VICTOR & CO., LTD., Coronation House, 4, Lloyd's Avenue, London, E.C.3	Royal 6382
MONSANTO CHEMICALS, LTD., Victoria Station House, Victoria Street, London, S.W.1	Victoria 1535
YORKSHIRE TAR DISTILLERS, LTD., 49, Billiter Buildings, Billiter Street, London, E.C.3	Royal 2319

Stearic Acid

LEVER BROS., LTD., Unilever House, Blackfriars, E.C.4	Central 7474

CELLULOID

BADER, E., & CO., LTD., 109, Kingsway, London, W.C.2	Holborn 3691-3
BX PLASTICS, LTD., Hale End, London, E.4	Larkswood 2345
HUGHES, F. A., & CO., LTD., Abbey House, Baker Street, London, N.W.1	Welbeck 2332-6

CELLULOID (SCRAP)

GREGORY, H. A., & CO., LTD., 6-7, Coleman Street, London, E.C.2	Metropolitan 1141

CELLULOID GOODS MANUFACTURERS

BRENTFORD CELLULOID PRODUCTS CO., The Butts, Brentford, London	Ealing 4240
CASCELLOID, LTD., Britannia Works, Abbey Lane, Leicester	Leicester 61223-4
GALALITH (LONDON), LTD., 9, Bridgewater Street, Barbican, London, E.C.1	National 3161
GENERAL CELLULOID CO., LTD., 206, Hanworth Road, Hounslow, Middlesex	Hounslow 1108-9
HALEX, LTD., Hale End, London, E.4	Larkswood 2345

CELLULOSE ACETATE

BRITISH CELANESE, LTD., Celanese House, Hanover Square, London, W.1	Mayfair 8000
BX PLASTICS, LTD., Hale End, London, E.4	Larkswood 2345
COLLCETONE, LTD., 15-16, New Burlington Street, London, W.1	Regent 2031
ERINOID, LTD., Lightpill Mills, Stroud, Gloucester	Stroud 510-1
HUGHES, F. A., & CO., LTD., Abbey House, Baker Street, London, N.W.1	Welbeck 2332-6
MAY & BAKER, LTD., Rhodoid Department, 42/3, St. Paul's Churchyard, London, E.C.4.	City 6555

CELLULOSE ACETATE MANUFACTURERS

BX PLASTICS, LTD., Hale End, London, E.4	Larkswood 2345
PHIPPS PLASTIC PRODUCTS, LTD., 244, Bromford Lane, West Bromwich	West Bromwich 1553
PLASTILUME PRODUCTS, Station Works, High Wycombe, Bucks.	High Wycombe 1610/1

CONSULTANTS

BARRON, DR. HARRY, 8/9, Bishop's Court, London, W.C.2	Holborn 5407
HIGGS, G. N., 93, The Avenue, London, W.13	Perivale 5404

DYES AND PIGMENTS

BINNEY & SMITH & ASHBY, 17, Laurence Pountney Lane, E.C.4	Mansion House 8383
BRITISH TITAN PRODUCTS CO., LTD., Billingham-on-Tees, Co. Durham	Middlesbrough 57151
CLAYTON ANILINE CO., LTD., Clayton, Manchester	Manchester East 1341-6
GREEFF, R. W., & CO., LTD., Thames House, Queen Street Place, London, E.C.4	Central 6550
IMPERIAL CHEMICAL INDUSTRIES, LTD., Thames House, Millbank, London, S.W.1	Victoria 3828
SHAWINIGAN, LTD., Lloyd's Avenue, E.C.3	Royal 4312
THE GEIGY COLOUR CO., LTD., National Buildings, Parsonage, Manchester	Blackfriars 9421-3
WILLIAMS (HOUNSLOW), LTD., Hounslow, Middlesex	Hounslow 1166

EBONITE DUST

FERGUSON, JAS., & SONS, LTD., Lea Park Works, Prince George's Road, Merton Abbey, London, S.W.19.	Mitcham 2283-6
I.C.I. (PLASTICS), LTD., Nobel House, Buckingham Gate, London, S.W.1.	Victoria 8432

FILLERS

Asbestos

ASBESTOS & MINERAL CORPORATION LTD., Bluefries House, 122, Minories, London, E.C.3.	Royal 2317
ASHBY, MORRIS, LTD., 17, Laurence Pountney Lane, London, E.C.4.	Mansion House 8383
BIRMINGHAM ASBESTOS LTD., 10, Bloomfield Street, Halesowen, Birmingham	Halesowen 1325
SCOTT, BADER & CO., LTD., 109, Kingsway, London, W.C.2	Holborn 3691-3

Slate Flour

"FULLERSITE," Port Penrhyn, Bangor, North Wales	Bangor 17

Wood Flour and Sulphite Pulp Powder

ANDREWS & CO., LTD., Blackfriars House, New Bridge Street, London, E.C.4	Central 2885
ATOMILL, LTD., Anchor Wharf, Weston Street, Bromley-by-Bow, London, E.3.	East 1792
DAHL, W. S., 22, Stanley Road, East Sheen, London, S.W.14	Prospect 3791
LAMB, ROBERT, Logie Green Works, Edinburgh	Edinburgh 23117-8

LAMINATED PLASTICS

ATTWATER & SONS, Hopwood Street Mills, Preston	Preston 4045-6
BAKELITE, LTD., 40, Grosvenor Place, Westminster, London, S.W.1	Sloane 9911-6
BUSHING CO., LTD., Hebburn-on-Tyne	Hebburn 49
BX PLASTICS, LTD., Hale End, London, E.4	Larkswood 2345
ELLISON INSULATIONS LTD., Perry Barr, Birmingham, 20	Birchfields 4554
IOCO RUBBER & WATERPROOFING CO., LTD., Netherton Works, Anniesland, Glasgow, W.3	Scotstoun 2201
METROPOLITAN-VICKERS ELECTRICAL CO., LTD., Trafford Park, Manchester, 17	Trafford Park 2431
STREETLY MANUFACTURING CO., LTD., Streetly, Sutton Coldfield, Nr. Birmingham	Streetly 7311
WARERITE LTD., Watton Road, Ware, Herts	Ware 322

LAMINATED PLASTIC MACHINERS

BURNS, J., & CO., LTD., Chadwell Heath, Romford	Ilford 0166

MACHINERY

Machines for Injection Moulding

DANIELS, T. H. & J., LTD., Lightpill Iron Works, Stroud, Gloucester	Stroud 236-7
DOWDING & DOLL, LTD., Greycoat Street, London, S.W.1	Victoria 1071-2
HERBERT, ALFRED, LTD., Coventry	Coventry 8781
SHAW, FRANCIS & CO., LTD., Corbett St., Manchester 11	Manchester East 0681
TECHNICAL MACHINES & ACCESSORIES, 17, Finsbury Square, London, E.C.2	National 6459

Machines for Casein Plastics

PREHN, HEINRICH, Naumburg, Saale	

Machines, Grinding and Pulverizing

BAKER PERKINS LTD., Westwood Works, Peterborough	Peterborough 3201
BOOTH, J., & SON, Congleton, Cheshire	Congleton 114
CHRISTY & NORRIS, LTD., Chelmsford, Essex	Chelmsford 3406
COHEN, GEORGE, SONS, & CO., LTD., 600, Commercial Road, London, E.14	Stepney Green 3434
MIRACLE MILLS, LTD., 90, Lots Rd., Chelsea, London, S.W.10	Flaxman 1456
STEELE & COWLISHAW, Cooper Street, Hanley, Stoke-on-Trent	Stoke-on-Trent 2100

Machines, Mixing, Kneading and Sifting

BAKER PERKINS, LTD., Westwood Works, Peterborough	Peterborough 3201
BLAIRS, LTD., Sardinia House, Sardinia Street, W.C.2	Holborn 1075
BOOTH, J., & SON, Congleton, Cheshire	Congleton 114
BRIDGE, DAVID, & CO., LTD., Castleton Ironworks, Castleton, Rochdale	Castleton (Rochdale) 5867-9
COHEN, GEORGE, SONS, & CO., LTD., 600, Commercial Road, London, E.14	Stepney Green 3434
DANIELS, T. H. & J., LTD., Lightpill Iron Works, Stroud, Gloucester	Stroud 236-7
GARDNER, WM., & SONS (GLOUCESTER) LTD., Bristol Road, Gloucester	Gloucester 2288
SHAW, FRANCIS & CO., LTD., Corbett St., Manchester 11	Manchester East 0681
STEELE & COWLISHAW, Cooper Street, Hanley, Stoke-on-Trent	Stoke-on-Trent 2100

Machines (Pelletting and Compressing)

BRADLEY & TURTON, LTD., Caldwell Works, Kidderminster	Kidderminster 117
DANIELS, T. H. & J., LTD., Lightpill Iron Works, Stroud, Gloucester	Stroud 236-7
FINNEY, GEORGE, & CO., Berkley Street, Birmingham, 1	Midland 3795-6
HABLA (GT. BRITAIN) SALES CO., 70, Newhall Street, Birmingham, 3	B'ham Cent. 1641-4
MANESTY MACHINES, LTD., Speke Hall Road, Liverpool, 19	Garston 1511
SHAW, JOHN, & SONS (SALFORD), LTD., Wellington Street Works, Salford 3, Manchester	Blackfriars 4844
WILKINSON, S. W., & CO., Western Road, Leicester	Leicester 21283

Machinery and Tools (Supplementary)

BROWN, DAVID, & SONS (HUDD.), LTD., Huddersfield	Huddersfield 3500
H. & D., LTD., Forest Road, South Yardley, Birmingham	Acocks Green 0612

MANUFACTURERS OF MOULDINGS

ASHDOWNS LTD., Eccleston Works, St. Helens.	St. Helens 3206
BELPLASTIC LTD., Hayden Place, Portobello Road, London, W.11	Park 5517
BIRKBYS LTD., Woodfield Mills, Liversedge, Yorks.	Heckmondwike 514-5
BLUEMEL BROS., LTD., Wolston, nr. Coventry	Wolston 22-3
BONNELLA, D. H., & SON, LTD., 46-48, Osnaburgh Street, London, N.W.1	Museum 1882 & 0504
BUSHING CO., LTD., Hebburn-on-Tyne	Hebburn 49
BYSON APPLIANCE CO., LTD., Woolfold, Bury	Bury 1560
COLE, E. K., LTD., Ekco Works, Southend-on-Sea, Essex	Southend 49491
CRAYONNE, LTD., St. Bernard Works, Bexley, Kent	Bexleyheath 1069
CRYSTALATE MOULDINGS, 153, Moorgate, London, E.C.2	Metropolitan 5574
DE LA RUE, THOS., & CO., LTD., Telenduron Works, 90, Shernhall Street, Walthamstow, London, E.17	Walthamstow 2900
DORCAM, LTD., Reddings Road, Acocks Green, Birmingham	Acocks Green 0850
EBONESTOS INDUSTRIES, LTD., Excelsior Works, Rollins Street, Canterbury Road, London, S.E.15	New Cross 1913
ELLIOTT, E., LTD., Victoria Works, Summer Lane, Birmingham	Aston Cross 1156-8

Continued on page vi.

A wide practical experience enables us to give reliable technical data and information on all these products.

DIRECTORY OF THE INDUSTRY

CONTINUED FROM PAGE iv.

Manufacturers of Mouldings—*continued.*

	Telephone Nos.
ELLISON INSULATIONS, LTD., Perry Barr, Birmingham, 20	Birchfields 4554
EVANS, F. W., LTD., Long Acre, Birmingham, 7	East 1344
EVERED & CO., LTD., Surrey Works, Smethwick, Staffs	Smethwick 0881-5
FORBES PLASTIC MOULDINGS, LTD., Bridge Works, Stamford Bridge, York	Stamford Bridge 54
FRASER & GLASS, LTD., Assembly Works, Woodside Lane, Finchley, London, N.12	Hillside 2224-5
HALEX, LTD., Hale End, London, E.4	Larkswood 2345
HEALEY MOULDINGS, LTD., 109, Great Hampton Row, Birmingham	Northern 2641
INJECTION MOULDERS, LTD., Westmorland Road, N.W.9	Colindale 8868
INSULATORS, LTD., Leopold Road, Angel Road, Edmonton, London, N.18	Tottenham 1491
KENT MOULDINGS, Cray Works, Sidcup, Kent	Sidcup 1195
LACRINOID LTD., Stafford Avenue, Gidea Park, Essex	Hornchurch 2981-4
LITHOLITE INSULATORS & ST. ALBANS MOULDINGS, LTD., Sandown Road, Watford, Herts	Watford 4494
LONDON MOULDERS, LTD., India Works, Exhibition Grounds, Wembley, Middx.	Wembley 5187-8
LORIVAL MANUFACTURING CO. (1921), LTD., Norwood Works, Southall, Middx.	Southall 1014
LUKELY ENGINEERING & MOULDING CO., LTD., Carisbrooke Road, Newport, I.O.W.	Newport 214
MICA MANUFACTURING CO., LTD., Volta Works, Bromley, Kent	Ravensbourne 2829
MOLLART ENGINEERING CO., LTD., Kingston By-Pass, Surbiton, Surrey	Elmbridge 3352-4
MOULDED PRODUCTS, LTD., Chester Road, Tyburn, Birmingham	Erdington 2201
N. B. MOULDINGS, LTD., Tremlett Grove Works, Junction Road, Highgate, London, N.19	Archway 2678
PARKER, WINDER & ACHURCH, LTD., 551, Broad Street, Birmingham, 1	Midland 5001-7
PLASMIC, LTD., 23, South Grove, St. Ann's Road, N.15	Stamford Hill 3778
PRECISION PLASTICS, LTD., Station Road, Acocks Green, Birmingham	Acocks Green 0177
PRESTWARE, LTD., Morden Factory Estate, Morden Road, Merton, London, S.W.19	Liberty 3421
PUNFIELD & BARSTOW, LTD., Basil Works, Westmorland Road, London, N.W.9	Colindale 7160
RAY MOULDINGS, LTD., Plant House, Longfield Avenue, W.5	Ealing 5314
ROANOID, LTD., 95, Bothwell St., Glasgow, C.2, Scotland	Central 4910
ROLLS RAZOR LTD., 255, Cricklewood Broadway, N.W.2	Gladstone 1042
ROOTES MOULDINGS, LTD., Trading Estate, Slough, Bucks	Slough 491
SCOTTISH MOULDING CO., LTD., 33, West Savile Terrace, Edinburgh	Edinburgh 41986
SOUPLEX, LTD., Morecambe, Lancs.	Morecambe 388
STADIUM, LTD., 75-77, St. Paul Street, London, E.C.2.	Clerkenwell 5401
STREETLY MANUFACTURING CO., LTD., Streetly, Sutton Coldfield, Nr. Birmingham	Streetly 7311
UNITED GLASS BOTTLE MANUFACTURERS, LTD., 8, Leicester Street, W.C.2	Gerrard 8611
UNIVERSAL METAL PRODUCTS, LTD., Langley Road, Pendleton, Salford	Pendleton 1631-2
VISCOSE DEVELOPMENT CO., LTD., Woldham Road, Bromley, Kent	Ravensbourne 2641

RUBBER AND RUBBER PRODUCTS

DUNLOP RUBBER CO., LTD., St. James's St., London, S.W.1	Whitehall 6700
EXPANDED RUBBER CO., LTD., Mitcham Road, Croydon, Surrey	Thornton Heath 3431
IOCO RUBBER & WATERPROOFING CO., LTD., Netherton, Works, Anniesland, Glasgow	Scotstoun 2201
NORTH BRITISH RUBBER CO., LTD., 200, Tottenham Court Road, London	Museum 5460
POPPE RUBBER & TYRE CO., Sherland Road, Twickenham	Popesgrove 2271
RUBTEX LTD., Printing House Lane, Hayes, Middlesex	Hayes 1198
ST. HELENS RUBBER CO., LTD., Slough, Bucks	Slough 333

METAL INSERTS AND SCREWS

BARBER & COLMAN, LTD., Marshland Road, Brooklands, Manchester	Sale 2277-8
HIBBERT & RICHARDS, LTD., 12, Roger Street, W.C.1	Holborn 9715
M.C.L. AND REPETITION, LTD., Pool Lane, Langley, Birmingham	Broadwell 1115

MILLS—BALL AND EDGE RUNNER

BAKER PERKINS, LTD., Westwood Works, Peterborough	Peterborough 3201
COHEN, GEORGE, SONS & CO., LTD., 600, Commercial Road, London, E.14	Stepney Green 3434
STEELE & COWLISHAW, Cooper St., Hanley, Stoke-on-Trent	Stoke-on-Trent 2100

MOULDING POWDERS

BAKELITE, LTD., 40, Grosvenor Place, Westminster, S.W.1	Sloane 9911-6
BEETLE PRODUCTS CO., LTD., Popes Lane, Oldbury, Worcestershire	Broadwell 1481 Heckmondwike 514-5
BIRKBYS, LTD., Woodfield Mills, Liversedge, Yorks	Mayfair 8000
BRITISH CELANESE, LTD., Celanese House, Hanover Square, London, W.1	Larkswood 2345
BRITISH XYLONITE CO., LTD., Hale End, London, E.4	Stroud 510-1
ERINOID, LTD., Lightpill Mills, Stroud, Glos.	Smethwick 0881-5
EVERED & CO., LTD., Surrey Works, Smethwick, Staffs	Mitcham 2283-6
FERGUSON, JAS., & SONS, LTD., Lea Park Works, Prince George's Road, Merton Abbey, London, S.W.19	Whitehall 8021
HONEYWILL & STEIN, LTD., 21, St. James's St., S.W.1.	Welbeck 2332-6
HUGHES, F. A., & CO., LTD., Abbey House, Baker Street, London, N.W.1	Victoria 8432
I.C.I. (PLASTICS), LTD., Nobel House, Buckingham Gate, London, S.W.1	Radcliffe 2024
INDURITE MOULDING POWDERS, LTD., Progress Works, Whitaker Street, Radcliffe, Lancs.	City 6555
MAY & BAKER, LTD., Rhodoid Department, 42/3, St. Paul's Churchyard, E.C.4	Byfleet 683
PERMASTIC LTD., Woodham Works, New Haw, Weybridge, Surrey	Feltham 2658
ROCKHARD RESINS, LTD., Browell's Lane, Feltham, Middx.	

PLASTICS ON PLYWOOD

NORCROSS PANEL PLYWOOD CO., LTD., 17, Albion Street, London, N.1	Terminus 6864

POLISHING MATERIALS

CANNING, W., & CO., LTD., 133, Great Hampton Street, Birmingham, 18	Central 3622
CRUICKSHANK, R., LTD., Camden Street, Birmingham	Central 7213
OAKEY, JOHN, & SONS, LTD., Wellington Mills, S.E.1	

PREFORMERS OF SYNTHETIC RESINS

PRECISION PLASTICS LTD., Station Road, Acocks Green, Birmingham	Acocks Green 0177
THOMPSON & CAPPER WHOLESALE, LTD., 62, Speke Hall Road, Liverpool, 19	Garston 1511

PRESS HEATING SYSTEMS

DANKS OF NETHERTON, LTD., Netherton, Dudley, Worcs.	Cradley Heath 6217
HEYWOOD & BRYETT, 13, Dartmouth Hill, London, S.E.10	Tideway 3386

PRESSES AND PUMPS

BAKER PERKINS, LTD., Westwood Works, Peterborough	Peterborough 3201
BERRY, HENRY, & CO., LTD., Croydon Works, Hunslet, Leeds	Hunslet 75481-2
BRADLEY & TURTON, LTD., Caldwell Works, Kidderminster	Kidderminster 117
BRIDGE, DAVID, & CO., LTD., Castleton Ironworks, Castleton, Rochdale	Castleton (Rochdale) 5867-9
COHEN, GEORGE, SONS & CO., LTD., 600, Commercial Road, London, E.14	Stepney Green 3434
DANIELS, T. H. & J., LTD., Lightpill Iron Works, Stroud, Gloucester	Stroud 236-7
DAVY & UNITED ENGINEERING CO., LTD., Park Iron Works, Sheffield	Sheffield 22161
FINNEY, GEORGE, & CO., Berkley Street, Birmingham, 1	Midland 3795-6
FRASER, ANDREW, Astor House, Aldwych, W.C.2	Holborn 2995
HYDRAULIC ENGINEERING CO., LTD., Charles St., Chester	Chester 1421
JONES, E. H. (MACHINE TOOLS), LTD., The Hyde, Hendon, London, N.W.9	Colindale 7272-5
PULSOMETER ENGINEERING CO., LTD., Nine Elms Iron Works, Reading	Tilehurst 67182
SHAW, FRANCIS, & CO., LTD., Corbett Street, Manchester	Manchester East 1415-7
SHAW, JOHN, & SONS (SALFORD), LTD., Wellington Street Works, Salford 3, Manchester	Blackfriars 4844

RESINS, SYNTHETIC

ATTWATER & SONS, Hopwood Street Mills, Preston	Preston 4045-6
BAKELITE LTD., 40, Grosvenor Place, Westminster, London, S.W.1	Sloane 9911-6
BEETLE PRODUCTS CO., LTD., Popes Lane, Oldbury, Worcs	Broadwell 1481
BIRKBY'S LTD., Woodfield Mills, Liversedge, Yorks	Heckmondwike 514-5
BLACKBURN & OLIVER, LTD., Perseverance Mills, Cleckheaton, Yorks	
BRITISH RESIN PRODUCTS LTD., 21, St. James's Square, London, S.W.1	Whitehall 8021
CELLOMOLD LTD., Browell's Lane, Feltham, Middlesex	Feltham 2658-9
ERINOID, LTD., Lightpill Mills, Stroud, Glos	Stroud 510-1
HUGHES, F. A., & CO., LTD., Abbey House, Baker Street, London, N.W.1	Welbeck 2332-6
I.C.I. (PLASTICS), LTD., Nobel House, Buckingham Gate, London, S.W.1	Victoria 8432
LORIVAL MANUFACTURING CO. (1921), LTD., Norwood Works, Southall, Middx.	Southall 1014
MONSANTO CHEMICALS, LTD., Victoria Station House, Victoria Street, London, S.W.1	Victoria 1535
SCOTT, BADER & CO., LTD., 109, Kingsway, W.C.2	Holborn 3691-3
STEEL, J. M., & CO., LTD., "Kern" House, 36-38, Kingsway, London, W.C.2	Holborn 2532
UHLHORN BROS., 53b, City Road, London, E.C.1	Clerkenwell 2458

Cast Resins

BAKELITE, LTD., 40, Grosvenor Place, Westminster, London, S.W.1	Sloane 9911-6
CATALIN, LTD., Farm Hill Road, Waltham Abbey, Essex	Waltham Cross 1040
I.C.I. (PLASTICS), LTD., Nobel House, Buckingham Gate, London, S.W.1	Victoria 8432
LORIVAL MANUFACTURING CO. (1921), LTD., Norwood Works, Southall, Middx.	Southall 1014
PERMASTIC, LTD., Woodham Works, New Haw, Weybridge, Surrey	Byfleet 683

Varnishes

ATTWATER & SONS, Hopwood Street Mills, Preston	Preston 4045-6
BAKELITE, LTD., 40, Grosvenor Place, Westminster, London, S.W.1	Sloane 9911-6
BIRKBYS, LTD., Woodfield Mills, Liversedge, Yorks.	Heckmondwike 514-5
I.C.I. (PLASTICS), LTD., Nobel House, Buckingham Gate, London, S.W.1	Victoria 8432

RESINS, NATURAL

PEALL ROY & CO., LTD., Alison Works, Ash Grove, London, E.8	Clissold 1046
HAMBURGER, M., 1a, Arbutus Street, London, E.8	Clissold 2422

SPECIAL STEEL FOR MOULDS

FIRTH, THOS., & JOHN BROWN, LTD., Sheffield	Sheffield 20081

SOLVENTS AND SOFTENERS

BARTER TRADING CORP. LTD., 14, Waterloo Place, London, S.W.1	Whitehall 1301
BLAGDEN, VICTOR & CO., LTD., Coronation House, 4, Lloyd's Avenue, London, E.C.3	Royal 6382
BRITISH INDUSTRIAL SOLVENTS LTD., 21, St. James's Square, London, S.W.1	Whitehall 8021
GREEFF, R. W., & CO., LTD., Thames House, Queen Street Place, London, E.C.4	Central 6550
HOWARDS & SONS, LTD., Ilford, nr. London	Ilford 1113
MONSANTO CHEMICALS, LTD., Victoria Station House, London, S.W.1	Victoria 1535
STEEL, J. M., & CO., LTD., "Kern House," 36-38, Kingsway, London, W.C.2	Holborn 2532-5

STEEL MOULDS

ARNOTT & HARRISON (1928), LTD., 22, Hythe Road, Willesden, London, N.W.10	Willesden 4000
BRITISH INDUSTRIAL PLASTICS, LTD., Ideal House, 1, Argyll Street, London, W.1	Gerrard 7278
C.V.A. JIGS, MOULDS & TOOLS, LTD., Portland Road, Hove	Portslade 8201
DORMER & WADSWORTH, LTD., Morris House, 60-66, Rochester Row, Westminster, S.W.1	Victoria 6463
FOX & OFFORD, LTD., 181-187, Alma Street, Aston, Birmingham, 6	Aston Cross 3215
HIGGINS, F. C., & SON, 1, Bedford Road, East Finchley, London, N.2	Tudor 3443
JOSELIN, C., & CO., Central Works, Brownhill Road, Catford, London, S.E.6	Hither Green 1726
JUNCTION MOULDS & TOOLS, LTD., Tremlett Grove, N.19	Archway 2679
MINERVA ENGINEERING CO., 5-9, Peacock Street, London, S.E.17	Reliance 1565
SALE, H. B., LTD., Summer Lane, Birmingham	Birmingham Cent. 5661

TEMPERATURE CONTROL EQUIPMENT

BRITISH ROTOTHERM CO., LTD., Station Road, S.W.19	Liberty 3406
BRITISH THERMOSTAT CO., LTD., Windmill Road, Sunbury-on-Thames	Sunbury-on-Thames 456

THERMOSTATS

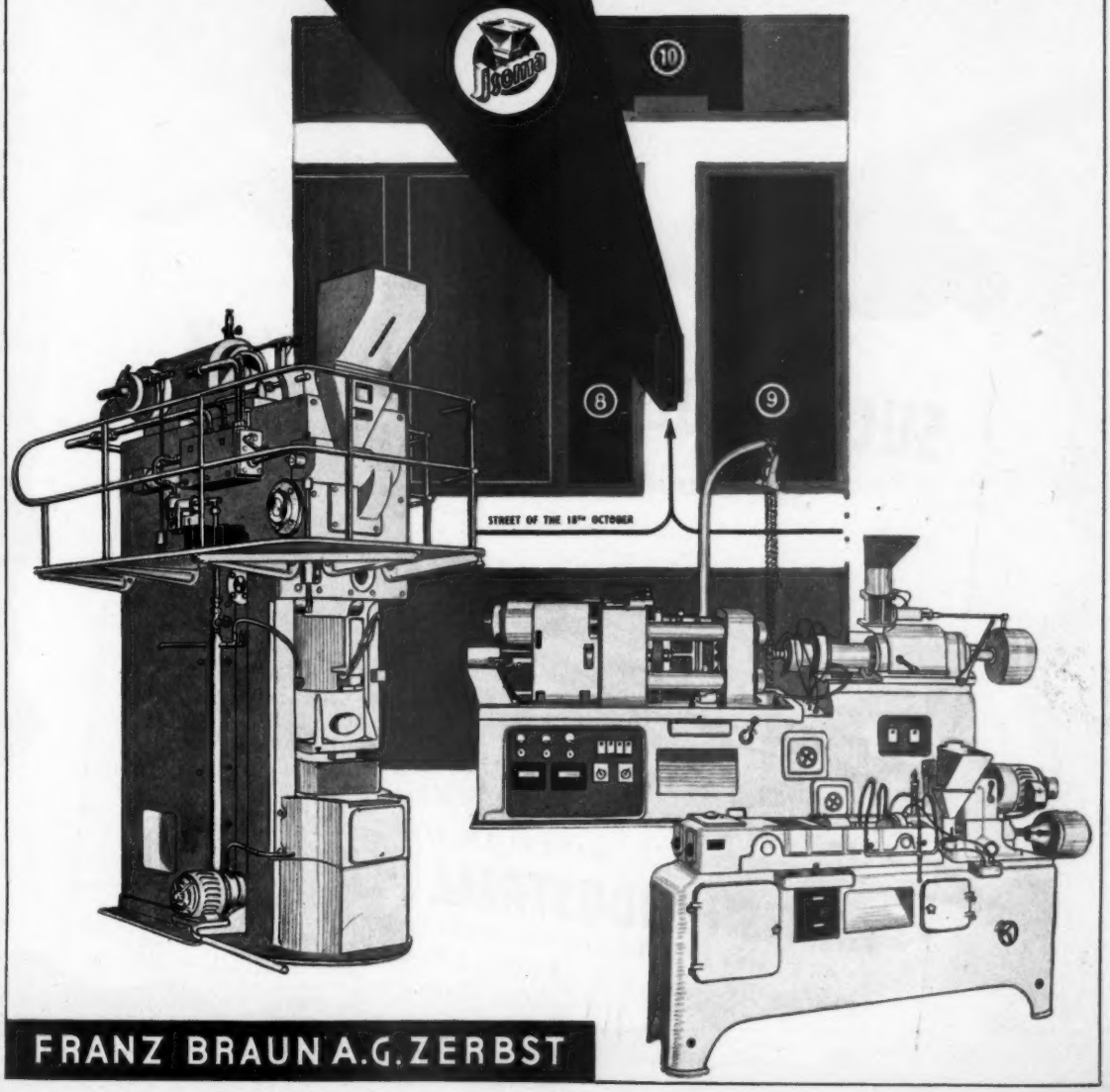
BRITISH ROTOTHERM CO., LTD., Station Road, S.W.19	Liberty 3406
BRITISH THERMOSTAT CO., LTD., Windmill Road, Sunbury-on-Thames	Sunbury-on-Thames 456

INCREASED PRODUCTION
by planned development

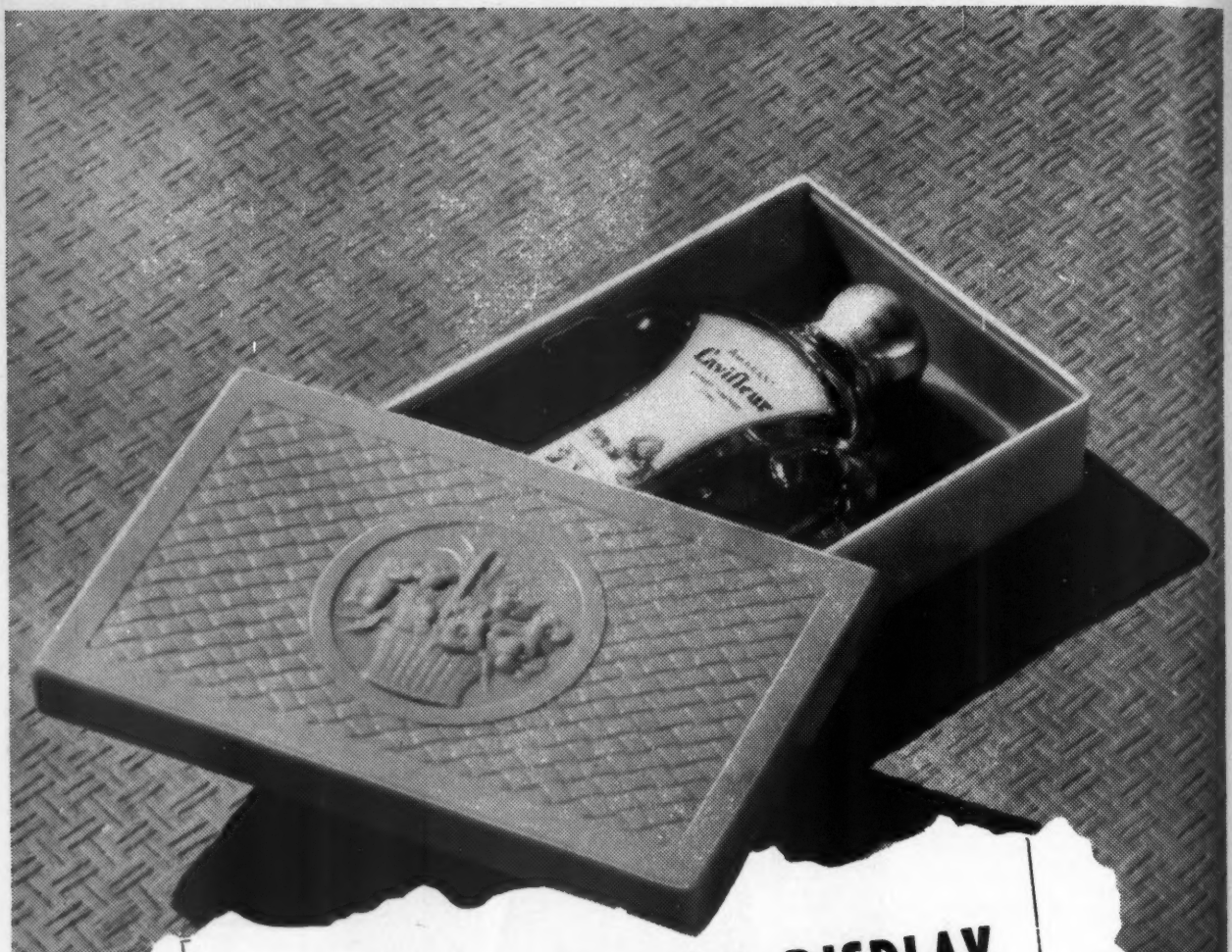
Latest practice in the Injection Moulding of Thermoplastics will be demonstrated by three Isoma Automatics at the Leipzig Fair. These machines incorporate the extensive practical experience acquired during the preceding manufacture of some 300 similar automatics. They are indeed outstanding examples of high production units based on carefully planned development work.

A special staff of experts will be at your disposal at Leipzig to advise in the solution of difficult moulding problems encountered with Thermoplastic materials.

DOWDING & DOLL LTD.
GREYCOAT STREET, WESTMINSTER, S.W.1



FRANZ BRAUN A.G. ZERBST



SUCCESSFUL BOXING DISPLAY

Stockholm comes to England

When A.B. Oxygenol of Stockholm wanted a pack to enhance the presentation of their "Lavifleur" they chose Streetly. Whether this confidence was justified you may judge from the box illustrated, a work of art in a lavender tone of Beetle.

The consistent demand for after-use packs even at a higher price is most effectively met by making use of the infinite colour variety and superb finish of the Beetle range of mouldstuffs.

Moulded for Messrs. A. B. Oxygenol of Stockholm by
STREETLY MANUFACTURING CO. LTD.

DIVISION OF

BRITISH INDUSTRIAL PLASTICS LTD

WORKS · STREETLY · SUTTON COLDFIELD · NEAR BIRMINGHAM
LONDON OFFICE · 1 ARGYLL STREET · LONDON · W·1

Plastics

Dealing with the Manufacture, Uses and Potentialities of Plastic Materials.

Vol. III. MARCH, 1939 No. 22

Index to Advertisers.

Ashdowns, Ltd. .. .. .. i.
Ashworth & Meredith, Ltd. .. .. x.
Bakelite, Ltd. .. .. xii.
Barber & Colman, Ltd. .. .. ii.
Birkbys, Ltd. .. .. v.
British Industrial Plastics, Ltd. .. viii.
British Rototherm Co., Ltd. .. .. xi.
British Xylonite Co., Ltd. Inside Front Cover
Byson Appliance Co., Ltd. .. .. xviii.
Catalin, Ltd. .. .. —
Cole, E. K., Ltd. .. .. .. —
Crystalate Mouldings .. .. .. —
Danks of Netherton, Ltd. .. .. xviii.
Dowding & Doll, Ltd. .. .. .. vii.
Ebonestos Industries, Ltd. .. .. xvii.
Ellison Insulations, Ltd. .. .. xiv.
Erinoid, Ltd. .. Inside Back Cover
Firth, Thos., & John Brown, Ltd. .. —
Forbes Plastic Mouldings, Ltd. .. —
Fraser, Andrew .. .. .. —
Gardner, Wm., & Sons (Gloucester), Ltd. xvii.
Hadley Co., Ltd. .. .. .. —
Harris, Alfred, & Co., Ltd. .. .. —
Hamburger, M. .. .. .. —
Healey Mouldings, Ltd. .. .. —
Higgs, G. N. .. .. xviii.
Hillier, Parker, May & Rowden .. xviii.
I.C.I. (Plastics), Ltd. .. .. .. xiii.
Injection Moulders, Ltd. .. .. —
Kayser, Ellison & Co., Ltd. .. .. —
Kautex (Plastics), Ltd. .. .. —
Manesty Machines, Ltd. .. .. —
May & Baker, Ltd. .. .. .. xiv.
M.C.L. and Repetition, Ltd. .. .. xviii.
Mercantile Sales, Ltd. .. .. —
Moulded Products, Ltd .. .. ii.
National Savings Committee .. iii.
Prestware, Ltd. .. .. —
Rootes Mouldings, Ltd. .. Back Cover
Rozalex, Ltd. .. .. xvii.
Steele & Cowlishaw .. .. .. xvii.
Synthite, Ltd. .. .. xi.
Technical Machines & Accessories .. —
United Glass Bottle Mfrs., Ltd. .. xv.
Young & Wolfe .. .. xviii.

Announcements.

"PLASTICS" is published in London, England, at the beginning of each month.

Head Offices: 5-17, Rosebery Avenue, London, E.C.1.

Inland Telegrams: "*Pressimus, Smith, London.*"
Cables - - "*Pressimus, London.*"
Telephone - Terminus 3636 (Private Exchange).

Midland Offices — Birmingham: 61/65, New Street.
Telephone—Midland 4117 (3 lines).
Telegrams—"*Presswork, Birmingham.*"

Coventry—50, Hertford Street.
Telephone—Coventry 60095 (2 lines).
Telegrams—"*Presswork, Coventry.*"

Northern Offices—Manchester: Deansgate House, 274, Deansgate.
Telephone—Blackfriars 5038-9.
Telegrams—"*Presswork, Manchester.*"

SUBSCRIPTION—"PLASTICS" will be mailed regularly to any address in the United Kingdom or abroad for—
Twelve issues for 15s. post free; Canada and Newfoundland 12 for 13s. 6d.; pro rata for fewer numbers.

COMMUNICATIONS—All letters regarding subscriptions, advertisements and other business matters must be addressed to The Manager, 5-17, Rosebery Avenue, London, E.C.1.

TEMPLE PRESS LIMITED
Proprietors, Printers and Publishers of "The Motor," "The Light Car," "The Commercial Motor," "Motor Cycling," "Cycling," "The Motor Ship," "The Motor Boat and Yachting," "The Oil Engine," "The Aeroplane" and "Light Metals."

5-17, Rosebery Avenue, London, E.C.1

Other notices appear on last page.

CONTENTS

	PAGE
Editorial	71
A Noble Casting	73
The Reasons Why—	74
True to Scale	76
General Release	78
B.I.F., 1939	80
When the Cap Fits	88
Ideas	92
Rubber in the News	94

Production:

Notes and Comments	96
Inquiries and Answers	97
Choosing a Plastic. By E. E. Halls	99
Trade and Personal Notes	102
New Materials—New Plant—New Methods ..	103

Telephone Temple Bar 5170.

ASAWORTA & MEREDITA LTD.

Designers, Photo Engravers and Illustrators

Specialists in the reproduction of high class Catalogue and Advertisement Blocks.

The Line, Tone and Colour Blocks used in this Publication are made by us.

167 STRAND · LONDON · W.C.2 ·

THE AEROPLANE

Founded in 1911

Edited by C. G. Grey

THE MOST INFLUENTIAL AVIATION JOURNAL IN THE WORLD

EVERY THURSDAY

6 D.

Head Offices: 5-17, *Rosebery Avenue, London, E.C.1.*

Editorial Offices: 175, *Piccadilly, London, W.1.*

Regular features include:

- News from all over the world.
- A Royal Air Force and Dominions Air Service Section.
- Foreign Service News.
- An Aeronautical Engineering Section.
- A Commercial Aviation Section.
- New Aeroplanes fully described.
- The Latest Sporting Flying News.
- Trade Notes.

The entire Journal is fully illustrated.

Yes, sir

YOUR OUTPUT WILL IMPROVE IF YOU USE

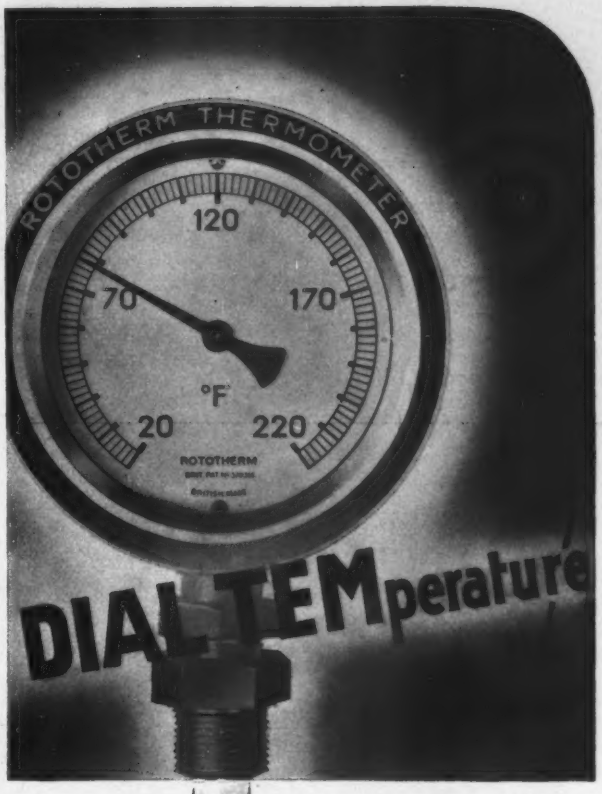
Synthite FORMALDEHYDE

It is not difficult to understand why Synthite Formaldehyde gives better results and better output. The reasons are fourfold.

1. Synthite is absolutely reliable and NEVER varies in quality.
2. It is guaranteed 40% by volume and absolutely water white.
3. It is completely free from impurities.
4. It is sold at advantageous prices and deliveries can be made in any quantity or form at intervals to suit YOUR convenience.

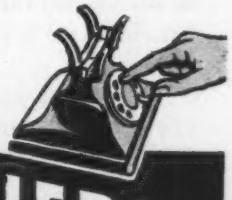
Send to-day for full details and free testing supply. As a favour, will you please mention this paper.

SYNTHITE LTD. WEST BROMWICH, STAFFS.
London Agents: Barter Trading Corporation Ltd., 14, Waterloo Place, S.W.1



The accuracy of a thermometer is no greater than the accuracy with which you can read it! That is why, having developed the Rototherm bi-metallic multiple-helix element to the point where it would give and maintain accurate temperature response over an indefinite period to within 1% of the total scale value, we next fitted the thermometer as a whole with clearly spaced dial markings and a black needle pointer. Your charge-hand can *read* a Rototherm gauge . . . at a distance . . . in poor light . . . always. That is just one of the reasons why Engineers in every industry are specifying Rototherm gauges at every important point.

FOR DESCRIPTIVE CATALOGUE No. 75
DIAL LIBerty 3406



ROTOTHERM
TEMPERATURE GAUGES
THE BRITISH ROTOTHERM CO. Ltd.
MERTON ABBEY, LONDON, S.W. 19. Phone: LIBERTY 3406

WORLD PATENTED.

Pitlofords

C

BAKELITE Veneers
on "The Coronation Scot"

All that is best in British materials and craftsmanship has been embodied in the L.M.S. "Coronation Scot" train for the New York Exhibition. For the first time in the history of British railway practice, plastics in sheet form have been employed in the interior decoration of the coaches. BAKELITE veneers have been extensively adopted for the surfacing of walls, doors and ceiling in the kitchen car and for the table-tops, cocktail bar, etc., in the first-class lounge car. The properties of the veneers—resistance to heat, moisture and alcohol and the ease with which they may be kept clean—are particularly valuable for the exacting conditions of service. The lounge was designed by Mr. Brian O'Rorke, A.R.I.B.A., while the kitchen car was designed and executed by the L.M.S. authorities.

Tables, cocktail bar, doors and window sills in the lounge car seen above (left) are surfaced with BAKELITE veneers in shades of blue and red. The walls, doors and ceiling of the communication corridor of the kitchen car (right) are finished with blue, cream and white BAKELITE Veneers.

BAKELITE LIMITED, 40 GROSVENOR PLACE, LONDON, S.W.1

Telephone: SLOane 9911 (6 lines). Works: BIRMINGHAM (Established 1910)

BAKELITE

Registered Trade Marks

TREFOIL

VENEERS • WALL PANELS • TABLE TOPS

Vol. III. No. 22 MARCH, 1939

Plastics

Dealing with the Manufacture, Uses and Potentialities of Plastic Materials

Proprietors - - TEMPLE PRESS LIMITED
Managing Director - ROLAND E. DANGERFIELD

Editor - - M. D. CURWEN, B.Sc., A.I.C.
Offices - 5-17, Rosebery Avenue, London, E.C.1

SET FAIR FOR 1939

IF business at the British Industries Fair is an accurate barometer of what the year's trading will be, then we shall be satisfied with 1939. To begin with, the whole atmosphere, political and economical, has been much more clarified and fears that foreign affairs might affect business have been completely unfounded. Coupled with the Prime Minister's recent speech, a real feeling of confidence is now replacing the comparative despondence of a few months ago. Indeed, it is not untrue to say that, judging from the buying movements, that despondence has definitely receded. Home buyers have not only been active, but the number of foreign inquiries has been the talk of the Fair. This was noticeable, we are told, in all sections, but in the Plastics Section, which is particularly under our review, the preponderance of foreign inquiries was remarkable. During the first two days we dare swear that there were more Dutch, French, Belgian and ex-Germans than British buyers and the inquiries were explicit. One thing is certain, that not only do the majority of these, who previously bought elsewhere, desire and prefer to buy now in Great Britain, but there is a strong desire to set up new factories for plastic goods in this country. Happily, in the main, such plastic goods are specialized products and have never before been produced here. On three stands in the plastics industry there were examples of such materials. We doubt very much if Great Britain will lose one iota of her industrial prestige as a result of the troubled years. It has already been indicated, in the daily papers, that the great fur centre of the world has now shifted from Central Europe to London. The same drift may yet be recognized in other trades. We should not be surprised if the brain-centre of the toy industry became situated in London. Certainly there are strong indications of it already. It is noteworthy that Great Britain is, except for the United States, the greatest consumer of high-class expensive toys in the world; it would surprise readers, very pleasantly, if they compared the economics of our present toy manufacture and trade with that of 10 years ago.

As for the Plastics Section at the B.I.F., once again we must congratulate the standholders on not only a very comprehensive show, in which almost all divisions of the industry were represented, but also on the fact that, while each exhibitor retained his individuality, yet the whole section stood out as one industrial unit. We are sure the buying public was much impressed.

We sorely missed two exhibitors. Imperial Chemical Industries, Ltd., had decided to incorporate all their exhibits on one stand and keep them in the Chemical Section, so that we did not see the marvel of Perspex and Diakon, except when they were shown in the form of finished goods on the stands of Thomas de la Rue and Co., Ltd., and Ebonestos, Ltd. Missing, too, was Catalin, Ltd., which last year made the brightest show of all. In this instance, too, however, brilliant examples were seen on other stands. The Axford Co. showed many games and new chess-sets made of the material and, at Birmingham, we saw a stand showing kitchen utensils, almost all of which were made of Catalin cast resin. Let us hope that, for next year's Fair, these two important firms will return to the fold.

Otherwise, the ranks of the Plastics Section were swelled by several newcomers—British Artid Plastics, Ltd., whose work is bound to prove of great value to the plastics industry as a whole; Dap Manufacturing Co., which has introduced extruded plastics into the building and house-furnishing industries, and Hydro Plastics, Ltd., which may yet affect the electric and cable industry so seriously as to become of outstanding national importance. It was the only stand devoted to manufactures purely in the vinyl-chloride type of plastic. We foresee a great future for these, not only in the electrical, but also in special sections of the fancy goods trade.

The course of development was seen, too, in other manufactures. The startling improvement, especially in design, of laminated veneers, was very pronounced in the Bakelite sheet. We are now seeing something which we have all hoped for, a veneer peculiarly adapted to plastics and not chained, in the matter of design, to the existing wood veneers. The same type of material in continuous strips was a special exhibit on the stand of Ebonestos, Ltd. Here the material does

not depend for its value on its surface beauty, but on its strength. It should prove of great value to the furnishing and other constructional industries.

Other important advances were noted on the stand of F. A. Hughes and Co., Ltd., who are making several new types of resin, two of which should please the non-mass-production side of the plastics industry. We refer to a new cast resin in liquid form and a new thermo-setting phenol-formaldehyde powder which is soft in the initial stages and remains so for a considerable period. Hardening is attained by subsequent stoving. This is certainly approaching the ideal material for the artist or "individual" worker, who has been so disappointed in the past by being unable to obtain from the plastic industry a clay-like material that will quickly harden to a hard mass as strong, as tough and as colourful as moulded synthetic resins.

Further progress in the manufactures of Erinoid, Ltd., are noted by the production of transparent foil, some excellent samples of which were on view. An iridescent foil, produced by hatching lines on the surface, was particularly attractive.

Planning for Plastics

IN the course of an address last month before the Plastics Group of the Society of Chemical Industry, Dr. Herbert Levinstein stressed the importance of forming a committee to correlate the essential raw materials obtained from coal, timber and agriculture. By this means there would be provided almost the whole range of organic chemicals necessary for our industries and our national health, both in time of war and peace. To take an example, benzol, which we obtain by distilling coal-tar, is of vital importance to our automotive industry as a fuel; it is a raw material for making carbolic acid, which is, in its turn, the most important raw material for our plastics industry and our disinfectants. Again, it is the main raw material for our dyestuffs industry and many medicinal products. We must see that all such raw materials were readily available in time of war. Calcium carbide, obtained by heating lime and coal, was another such material and yet none is made in this country. All is imported, either from Norway, Sweden or Canada. Yet without carbide and the gas acetylene obtained from it industry would be dislocated. Were carbide to be manufactured here, and he hoped the Flintshire scheme for producing hydro-electric power would be hastened and put into effect, we could not only have abundant acetylene, but also alcohol from the very acetylene made. Cheap acetylene would make possible the production of the vinyl chloride resins, which are bound to have a great future. Alcohol is already of first importance to our plastics industry, for it is not only a solvent for synthetic resins, but can be made the basis of new ones. In passing, it is of interest to note that there now exists, in this country, a factory for producing plastics of the vinyl chloride type. It may well prove the first unit in a great industry. There was also need, Dr. Levinstein said, for afforestation to be treated as part of a national scheme of planning, interlocked with industry and agriculture. Such a scheme was long overdue, for our very future may depend on what we do with our potential supplies of cellulose, whether it be wood or straw.

Dr. Levinstein, who, at one time, was head of one of the largest dyestuffs factories in the country, is very well qualified to view, as an economical whole, the chemical and industrial chemical possibilities of our natural raw materials. Already such organization of resources is taking place in Germany, where the importance of timber, for example, is recognized as a raw material for producing cellulose for plastics or for clothes, or for sugar, and preparations can be made accordingly.

Let us hope that adequate steps will also be taken here.

A Note From Mr. Cochran

49, Old Bond Street,
London, W.1.

The Editor, *Plastics*.

Dear Sir,—Many thanks for calling my attention to the article referring to the use of plastics in Mr. George Black's great show, "These Foolish Things."

As a progressive producer, Mr. Black would be sure to use plastics.

I have used a great deal of "Cellophane" for many years. I don't know whether we called it by that name in 1911, when we had something which seemed to me just like it, in the production of "The Miracle" at Olympia, for certain costumes and for some stained glass window effects.

In the revival of "The Miracle" at the Lyceum in 1932 we used a great deal of "Cellophane" for costumes, as we did for several of my revues at the London Pavilion, notably "This Year of Grace."

Mr. Oliver Messel is particularly fond of plastic materials, and made great use of them for my production of "Helen" at the Adelphi Theatre.

In "Streamline" I recall we had some magnificent imitation glass shades made of "Rhodoid." I believe it cost about 2s. 6d. per ft. The only difficulty I found in its use was that it could only be bent one way.

Of course, the theatrical use of these materials has only just commenced; there will be great development.

CHAS. B. COCHRAN.

[EDITOR'S NOTE.—Historically this letter is of great interest, especially we did not know that a "Cellophane"-like sheet existed in 1911. With regard to "Rhodoid," we presume attempts were made to bend "Rhodoid" in the cold at very sharp angles. Under heat, "Rhodoid" can readily be made to "bend" with two or more sharp angles by heat embossing, still retaining the original strength.]

The "Trans-a-Parent Book"

The so-called "Trans-a-Parent Book" is now being shown at an exhibition now open at the New York Museum of Science and Industry, Rockefeller Centre. The inventor of the book, which, it is claimed, will be very useful for schools and also advertising promotion schemes, is Dr. S. Theo Jonas. The book is made up of leaves of transparent cellulose film and the pictorial contents are printed first in pictorial sequence and then as a composite picture of the entire process to be illustrated. When all the transparencies are superimposed the various individual scenes making up the book can be arranged so that they blend together and show at a glance and with three-dimensional perspective the whole story of, say, a tree to a chair, or coal to the manufacture of dyestuffs or oil. The inventor claims that, whether the story is that of an industry or of arithmetic fractions in which the segments of a circle take their place as the leaves turn, it is made visible as a unit.

A NOBLE CASTING— in a NOBLE RESIN

The New York Fair will be embellished with twelve of these magnificent statues, cast of Marblette, a phenolic resin. They will be lighted from within to show their transparent beauty. The artist, Ralph Mancuso, stands by his work.

HAIL Columbia!

Filled with admiration, tinged with a touch of jealousy, we draw our readers' attention to the largest figure ever produced in cast resin. America is, indeed, the country of big ideas and big doings. And do not be misled by those who see little in big mouldings, for the technique involved in large castings is very different from that of small ones, and those who undertake it glean information that is invaluable for the development of markets yet untouched.

Our very friendly American contemporary, *Modern Plastics*, describes at length the casting portrayed here, which is one of 12 translucent figures cast from Marblette, the phenolic resin manufactured by the Marblette Corporation. Each statue stands 9½ ft. high and measures 8 ft. across at the base, and weighs nearly two-thirds of a ton! They are lighted from within, and will be the main attraction at the U.S. Government exhibit at the forthcoming New York Fair.

The story behind these statues is as fascinating as they are industrially important.

Ralph Mancuso is an American sculptor who has specialized in cast resins for some years. He produces, normally, relatively small statuettes from this raw material, varying up to about 2 ft. high. His researches led him to discard normal plaster and gelatine moulds, as they were obviously unsuitable for a material that must be cured at an elevated temperature, and steel moulds because they were too expensive. In a special rubber he found the solution to the problem. It would not crack under expansion, would take undercuts and is cheap. He then started the Art Plastics Co. and now produces statuettes of all sizes, both for interior decoration and as garden ornaments.

When the idea of featuring the U.S. Government exhibit by statues was first mooted, the contractors had first planned to make them in glass, so that they could be lighted from within. This, however, would have entailed an expenditure of over £13,000, and the weight of each statue would have been something like 1½ tons to 1¾ tons. Glass was therefore out of the question. The solution was solved when Mr. Mancuso was approached, although the actual casting must have been rather in the nature of a nightmare, for one of the greatest problems was that of curing the resin in huge rubber and plaster moulds in gigantic ovens, over a period of 10 days at a temperature of 85 degrees C.

We can well imagine the anxiety of the artist when, at the final stage, he peeled off the rubber moulds to reveal the moulding beneath.

We congratulate both the artist and the contractors for their very courageous effort.

REASONS WHY—

Two Famous Manufacturers of Shaving Outfits tell you why they use plastics

IN a letter received from Gillette Industries, Ltd., the Sales Manager writes: "We issue several hundred thousand moulded cases every year. As a medium, plastics enjoy many advantages over metal, being both cheaper and more durable. The moulded case has also a great advantage from the point of view of cost, thus enabling us to offer better value for money. There is no doubt that plastics have been a great boon to our class of business, as they enable us to offer a sturdy, good-looking and colourful razor case which is hygienic and non-corrosive, attributes which make it particularly suitable for hot and humid climates."

Here is a testimonial which, coming as it does from a leader in this particular field, crystallizes, in a few short sentences, all the advantages of plastics over metal and wood and drives home the fact that, from a hygienic standpoint, these new materials are in every way suitable for making into attractive and eminently serviceable shaving and toilet requisites. The question of weight is also important and, here again, the moulded container has a great advantage as it is considerably less than a similar one made of metal and this, of course, means lower freight charges for the manufacturer and wholesaler and greater convenience for the user. As regards the lower manufacturing cost of moulded razor cases, it is also worth pointing out that the actual production of the latter is very much simpler than making metal or wooden ones. After moulding, all that is necessary is to remove the flash, polish and complete the assembling of the article in one or two simple operations. In the case of metal and wooden boxes, it is necessary to spray the finished work and line it with paper or suitable material. These additional operations, which are eliminated in the case of mouldings, are expensive and take up a good deal of time.

Moulded containers for Gillette shaving outfits. Note the special moulded rest for the Valet razor.

This simply but efficiently designed brush drier was moulded by Insulators, Ltd., for Culmak.

Here is a neat shaving outfit, both brush handle and shaving - stick container being moulded.

Turning now to moulded shaving brushes, it is interesting to consider the opinion of Mr. Alban R. Culmer, Managing Director of T. W. Culmer and Sons, Ltd., Culmak Works, one of the best known concerns in the trade and responsible for an annual output of nearly a million shaving brushes. In an interview, Mr. Culmer said that shaving brush handles are produced in various materials, the cheapest being wood coated with a cellulose finish, then comes celluloid, next synthetic resin and, more recently, handles moulded in Beetle or similar material.

Mr. Culmer stressed, however, that to achieve success with the moulded handle the closest collaboration between the moulder and brush maker is essential, pointing out that whilst from the moulding point of view there are practically no limitations regarding design, there are many pitfalls to be avoided, and that only the closest attention to detail both of construction and temper of the material will lead to the production of a handle that is both pleasing in appearance and capable of standing up to the strains and stresses that it will be subjected to under working conditions.

In this respect it is well to bear in mind that lack of knowledge or carelessness in regard to detail may easily result in bringing discredit upon what should be a most serviceable method of production.

Summarized quite briefly, the advantages of the moulded handle are its clean and permanent colour, good finish, and absolute uniformity of production.

Apart from moulded handles for shaving brushes, Culmak make other uses of plastics. Their latest accessory, designed in a strictly modern manner, is an ingenious and practical shaving-brush drier, which helps to preserve the life and usefulness of the brush quite considerably. Other mouldings include shaving-stick holders in the popular ivory Beetle, as well as in other colours to match the brushes, and go to make up a complete kit which is attractively presented in a modern package and priced so as to appeal to a large section of the buying public.

It is certainly very gratifying to be able to record that manufacturers of high-class shaving requisites, such as safety razors and shaving brushes, should be so enthusiastic about the future of plastics in their own particular fields, and it is to be hoped that future developments will be thought and planned in plastics. The success so far achieved has, it is generally considered, been due to the close collaboration between the manufacturer, who knows what he wants, and the moulder, who is able to translate these requirements into concrete forms of plastics.

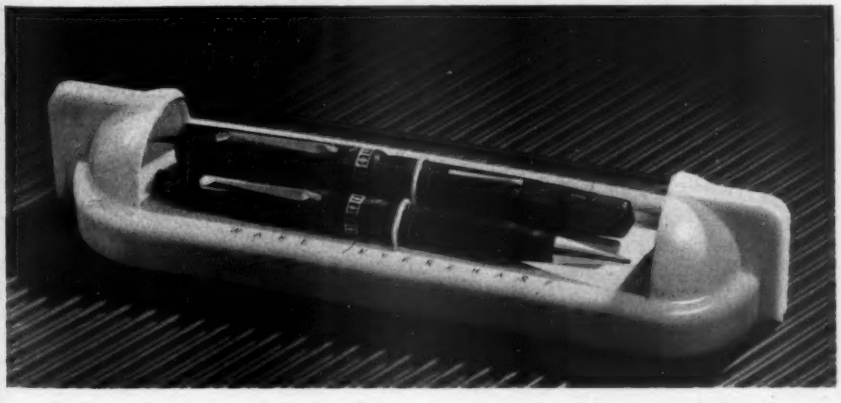
The Streamlined Moulded Pack

The Wahl-Eversharp package was designed to meet the demands of sales executives, dealers and factory production men for a simpler, less-expensive package with greater display and sales value. The new case, of spherical design cut lengthwise by two streamlined fins, is made of Bakelite in a choice of white and two colours, with an inserted transparent "bay window" of amino resin.

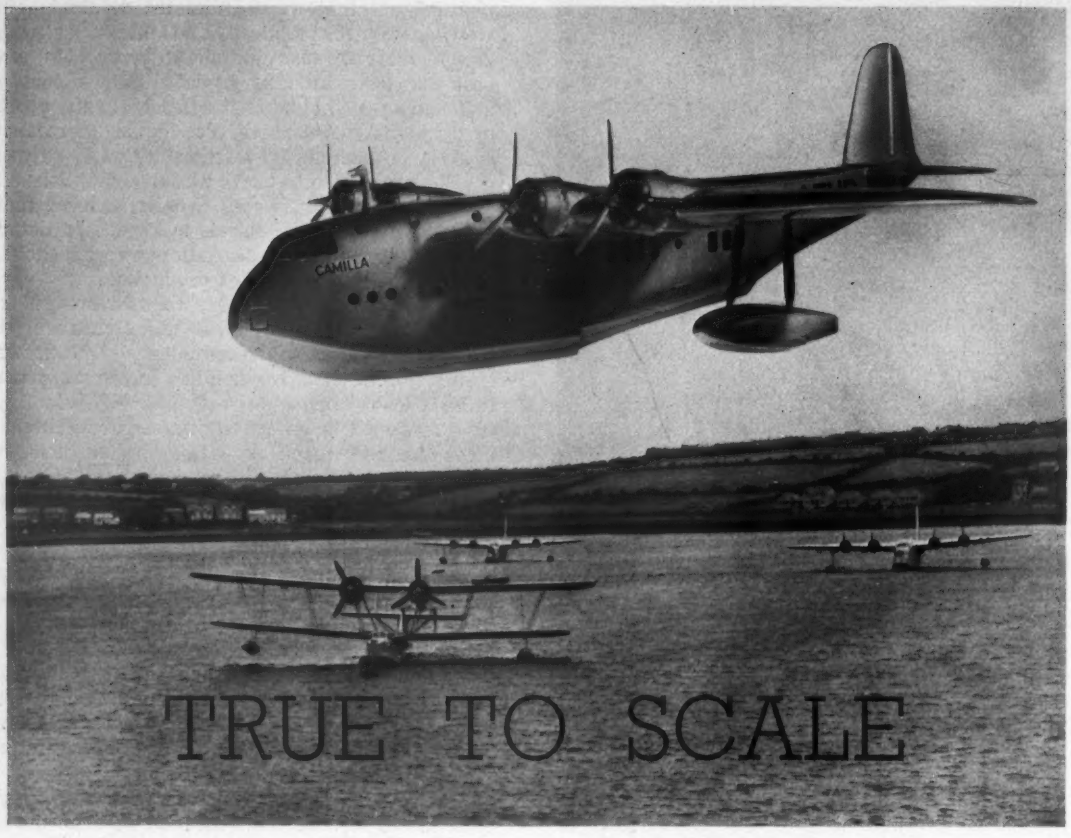
From the sales standpoint of executive and dealer, it meets every specified requirement. The sleek modern lines of the case provide a quality atmosphere for the pen and pencil, giving them a dramatic, attractively modern display setting. The case stands out on dealers' counters and has the added advantage of keeping the product itself untouched, while permitting easy inspection from every angle.

Factory production men welcome its simplicity as warmly as those interested primarily in sales welcome its attractiveness. There are only three parts to the package—the plastic frame, the transparent amino resin window and the removable felt-covered bottom board on which the pen and pencil are mounted. The plastic frame is made from a one-cavity mould, the window slips into grooves and is held in place entirely by its own spring tension. The removable bottom board is held in place by friction. Complete assembly takes about four seconds.

At present it is too early to give exact sales figures, but initial reports indicate enthusiastic acceptance.



This package was awarded Honourable Mention in the 1938 All America Package Award Competition. The first prize in this competition was also awarded to the Auburn Button Works, who are the moulders.

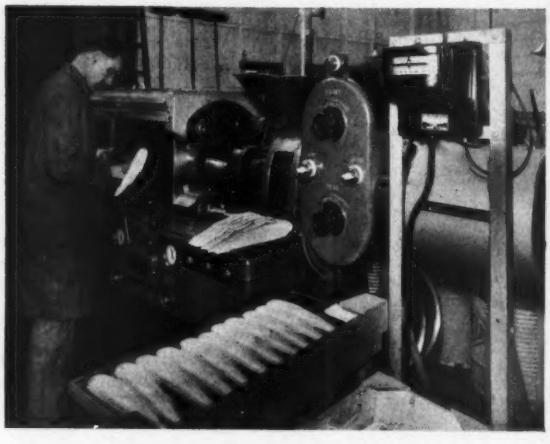


TRUE TO SCALE

THE days of tops, hoops and wooden horses have long since passed away and youth in 1939 demands reality in toy form. True-to-scale models of record-breaking locomotives, A.A. guns, racing cars and, above all, those leviathans of the sky are the toys youth requires to-day.

Model making has become a form of precision engineering and calls for a highly specialized method of manufacture and the collaboration of a designer with new ideas, who can translate them in practical form. Seven years ago International Model Aircraft, Ltd., South Wimbledon, London, started out to build real flying scale models of aircraft. Their first and most successful production was the world-famous "Frog" MK. IV, which is now available in 10 colourful models, each with correct national markings. The "Frog" was originally planned as an all-metal construction, but Mr. C. M. Wilmot and Mr. J. N. Mansour, the originators and directors of the company, kept an open mind regarding the advisability of using other materials. Plastics, naturally, received consideration and an attempt was made to mould small parts, such as nose-pieces, wheels and, later, scientifically designed air screws of cellulose acetate. At first, hand presses were used to supply the growing need for small precision mouldings and, later on, a Reed-Prentice was installed.

Whilst it was realized that the application of plastics for the construction of flying models was necessarily limited, as cellulose acetate, in the thickness required, is too heavy for the fuselage and wings, it was ideally suitable for the manufacture of stationary models. Once this fact was appreciated, the directors asked their chief designer, Mr. J. M. Wilmot, to go ahead and produce a new range called the Penguin series.



Producing half sections of the hull of the Imperial Airways flying boat on the Reed-Prentice.

The appearance on the market of 16 different Penguin models of small size so impressed Mr. Snowden Gamble, of Imperial Airways, that he suggested that International Model Aircraft, Ltd., should go a step farther and produce a really big model, which could be used for publicity purposes. This was the Empire boat, or, to give it its full name, the Short "Empire" ocean-going liner. Imperial Airways ordered 1,500 of these models for display in the offices of their agents.

The flying-boat is made up of six large mouldings and 27 small ones. The largest mouldings are a half section of the hull (which weighs 2⅛ oz). and half of the wing, both of which weigh 2⅛ oz. The actual manu-

Applying a special cement to the edges of the hull for joining.

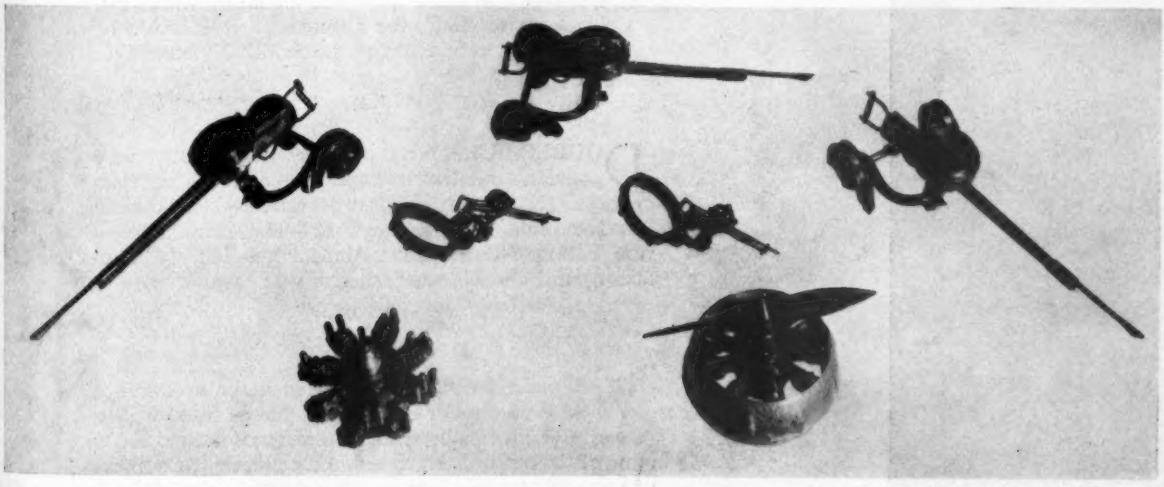
Fixing the wings in position with the help of the jig.

facture of this model takes place in several clear-cut stages. First of all the tools are made from drawings supplied by the chief designer. Then the moulding is carried out on the Reed-Prentice, which is capable of turning out something like 500 sides of a hull per day. The two halves of the hull are then stuck together with special cement and kept in position with rubber bands. The wings are then stuck on to the hull with the aid of a jig, which ensures that they are in exactly the right position. After allowing three or four hours for the cement to harden, the entire model is coated over with a weak solution of cellulose acetate to fill up the pores. The surface, when dry, is rubbed down with wet sandpaper until free from all blemishes and perfectly smooth. It is then sprayed with aluminium cellulose finish, dried and finally lacquered. Identification letters, etc., are transferred on.

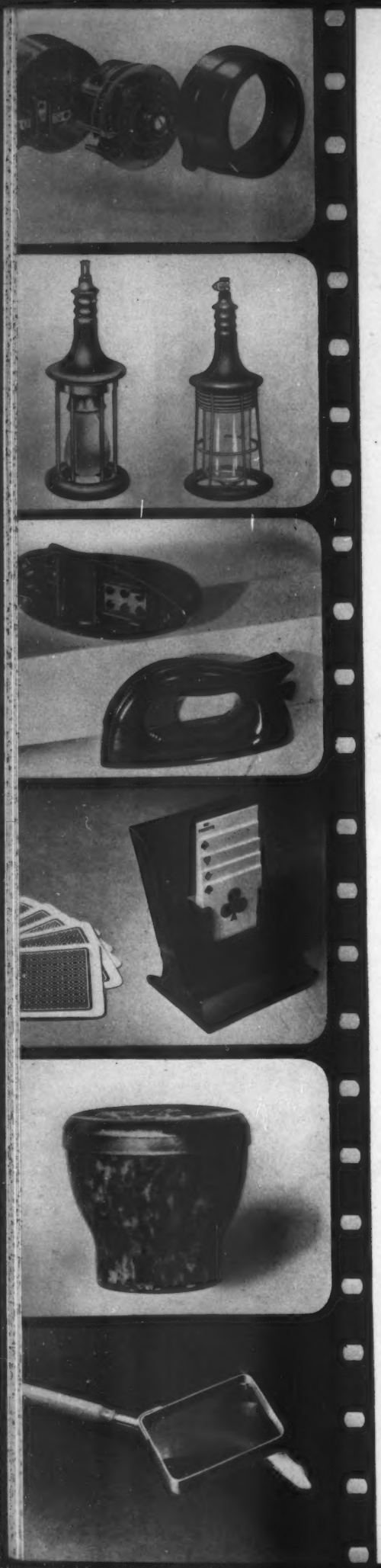
In an interview with Mr. J. M. Wilmot, the chief designer, he stressed the fact that International Aircraft, Ltd,. are enthusiastic about the possibilities of plastics for model aircraft, and they look forward to the time when they will be able to use it for their flying, as well as stationary, models. So far, only cellulose acetate, in the form of Cellomold, is used for bulk moulding, but small parts, demanding a certain amount of rigidity and extreme accuracy of fitting, are being moulded of

Sanding the assembled model ready for spraying.

Trolitul. No doubt special shock-resisting Bakelite and amino resin powders will eventually be used for moulding nose pieces, wheels, etc. Mr. Wilmot considered that the use of paper impregnated with phenol-formaldehyde resins would be the next development, as the material is strong and light.



Almost life-size mouldings of machine guns, aero engine and airscrew.



"General Release"—I

New and Interesting Plastic Goods

PLASTICS are now recognized as valuable and trustworthy materials in the electrical industry for special applications. These Sangamo time switches are provided with moulded Bakelite cases, so as to ensure perfect insulation, freedom from corrosion and other serviceable and highly desirable properties.

THESE all-insulated and watertight safety hand lamps are now in great demand for A.R.P. They are planned and built for exceptional hard wear, and are shockproof and unbreakable. The handle is made of rubber, and the shield for the lamp moulded of Bakelite. Victor H. Iddon, Ltd., Harper Road, Wythenshawe, Manchester, are the manufacturers.

THE "Sunbeam" iron handle, measuring 6¾ ins. in length, is a sturdy moulding designed for long service. It is moulded by the Gorham Co., Plastics Division, Providence, Rhode Island, U.S.A.

PLASTICS are trumps for a good many purposes, and here's a smart little Bex moulding which certainly seems to clinch the argument. It is made by Halex, Ltd., a subsidiary of the British Xylonite Co., Ltd.

DOUBLE-PURPOSE packages are now very popular, and the latest effort comes to us from France. It is a moulded egg cup of phenolic resin used to hold Neff beef extract. The manufacturers are Fabrique de Produits Alimentaires-Neff, 44, Faubourg du Phin, Thann, France.

WE understand that Mr. Sexton Blake uses one of these reading or magnifying glasses fitted with a smart Catalin handle, and no wonder, for it is easily one of the most distinguished and convenient examples of its kind on the market. It is sold in this country by Newbold and Bulford, Ltd.

"General Release"—II

New and Interesting Plastic Goods

MANY famous companies, specializing in pharmaceutical goods, are using mouldings as containers. Parke Davis and Co., Ltd., have recently introduced these two lines packed in phenol-formaldehyde moulded containers. On the left is a Dermaseptic shaving stick holder, and on the right a new pack for their special Neko germicidal soap.

THIS new G.E.C. ceiling switch is moulded of Bakelite at the company's works, Witton, Birmingham. It is sturdily designed and will undoubtedly fulfil a growing need in a large number of homes.

NO fear of missing a dose when this ingenious "Hour Cap" is used. Indexing Devices Corp., U.S.A., are responsible for the device. A small steel bearing, inserted in a ribbed groove so that it cannot come out, may be moved to the right for the next dose. Thus customers can tell at a glance when it's time to take the medicine again.

HERE'S a new streamlined moulded watch box planned to make the jeweller's shop window more attractive and thereby increase sales. The length of the moulding is 8¼ ins., and the moulders are the Gorham Co.

DESIGNED specially for someone's birthday, this smart dressing-table set, with coloured medallions inserted on the back of the pieces, should prove very popular. Complete in leatherette-covered case, lined with satin and velvet, the outfit costs three pounds. Halex, Ltd., are the manufacturers and the material is Xylonite.

THESE smart-looking mouldings of amino resin powder contain pure menthol cones and are made by S. Maw, Son and Sons, Ltd., London, who are now making generous use of plastics, in one form or another, for packaging their speciality lines.

THE 1939 BIF

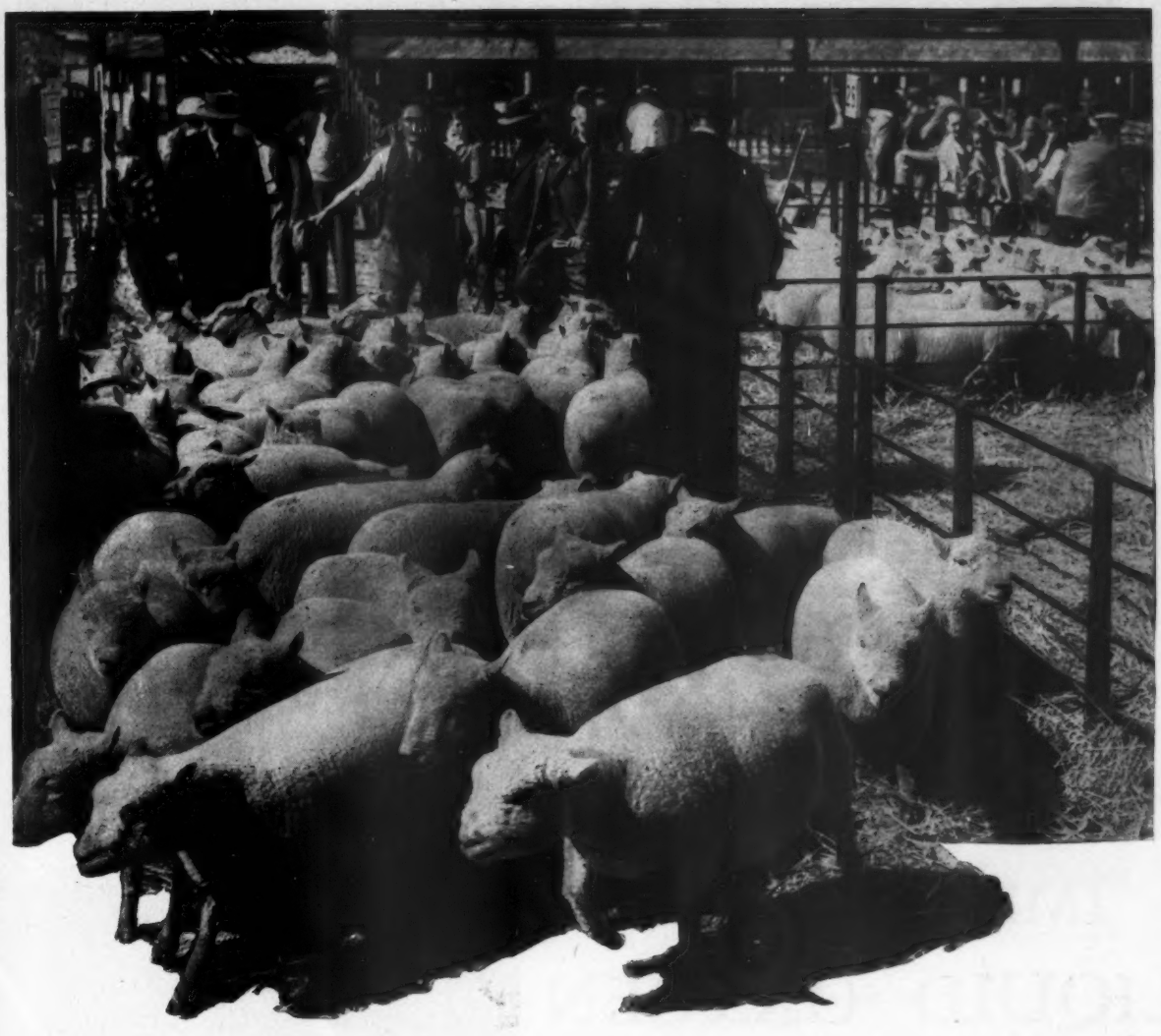
BETTER than ever! Collectively, it was one of the most comprehensive of plastic shows we have seen, and generally showed the wisdom of the British Plastics Federation in maintaining the Plastics Section tightly segregated and uniform in structure and lighting. There is one thing wanting, however—the inclusion of fabricators of finished goods from the plastic acetate sheet and the manufacturers of the sheet itself. The industry is very large, but at present it prefers to show in the fancy goods sections. However, this is a matter for the future. It would be a very healthy sign if every form of plastic material were congregated together.

As in the March, 1938, description of the Fair, we are compelled, through lack of space, to mention only a few of the many productions of each concern. For the same reason we are compelled to hold over several other photographs until the April issue.

Ashdowns, Ltd. Olympia and Castle Bromwich

The two exhibits of this large concern were different, very radically, from one another, that in London being specific, while that in Birmingham was quite general in character. This is certainly a novel departure, but we think eminently successful, for in the Olympia exhibit the mind was not allowed to stray to a multitude of manufactures, but was forced to concentrate on one specific field of plastics. In this instance it was ships' furniture, and, as the photograph of this stand shows, we saw the plastic-furnished interior of a ship's cabin, with bathroom complete. And since moulded and other plastics are such a logical form for producing such goods which are so exposed to the action of salt water, air and sun to their great detriment, we hope that ship-owners and builders were duly impressed. Door knobs

(Continued on page 81)



WHAT'S THE DIFFERENCE?

Sheep may all look alike to the layman, but a shrewd buyer soon spots the vital points of difference. In the same way, an expert moulder quickly assesses raw materials on their ability to produce mouldings of *strength*, *accuracy*, *and good finish*, and if he buys exclusively from I.C.I. (Plastics) Ltd., it is because their products give consistently good mouldings with just those characteristics.

For full information write to

I.C.I. (PLASTICS) LIMITED

NOBEL HOUSE, BUCKINGHAM GATE, LONDON, S.W.1

'Phone : VICtoria 8432 *'Grams* : Iciplast, Telex, London
Cablegrams : Iciplast, London *Codes* : A.B.C. 5th and 6th Editions, Bentley's
Midland Sales Office : LOMBARD HOUSE, GT. CHARLES STREET, BIRMINGHAM, 3. *Phone* : CENtral 2765

M.32

CELLULOSE ACETATE & POLYSTYRENE RESIN

RHODOID Cellulose acetate sheet, rod, tube and thread

NACROLAQUE Mother of pearl

RHODIALINE Transparent material 2/10 to 10/10 mm. in continuous reels

RHODOPHANE Thin film in reels or sheets

RHODIALITE Cellulose acetate moulding powder

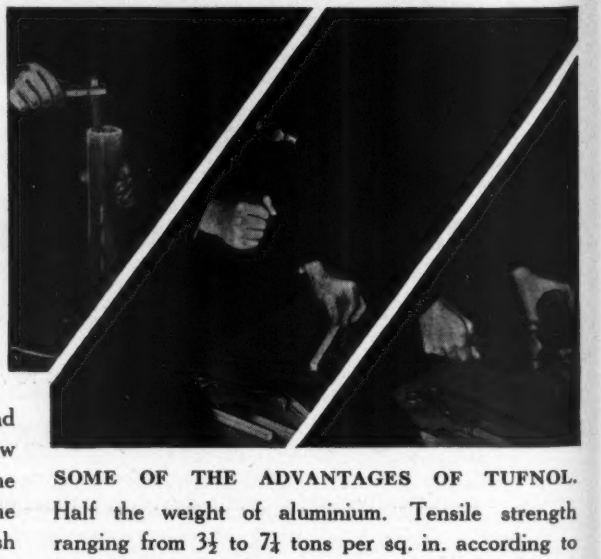
RHODOLENE Polystyrene resin with outstanding electrical properties

MAY & BAKER LTD.
42-43, ST. PAUL'S CHURCHYARD
LONDON - - E.C.4

TELEPHONE: CITY 6555
TELEGRAMS: MAYBAKA, CENT, LONDON
CABLEGRAMS: MAYBAKA, LONDON

IMMERSED IN LIQUID OXYGEN

297° F. below zero yet quite unaffected!



The photographs on the right show how a piece of Tufnol and a piece of rubber were immersed in liquid oxygen—at 297° F. below zero. On removal the rubber smashed like a piece of glass at the first blow of the hammer. Tufnol was quite unaffected by the treatment. (We acknowledge the kind assistance of the British Oxygen Company in making these experiments.) Tufnol has innumerable uses and is employed in practically every industry, in hundreds of different ways. Whatever your own particular requirement, you will find a brand of Tufnol to suit it.

SOME OF THE ADVANTAGES OF TUFNOL. Half the weight of aluminium. Tensile strength ranging from 3½ to 7¼ tons per sq. in. according to brand. Non-metallic. Grade I electrical insulator. Unaffected by oil, petrol, most acids, alkalies, chemical fumes and excessive cold. Resilient. Non-brittle. Can be machined like metal.

TUFNOL Regd. Trade Mark

Ask for the uses to which Tufnol has been put in the Plastics Industry.

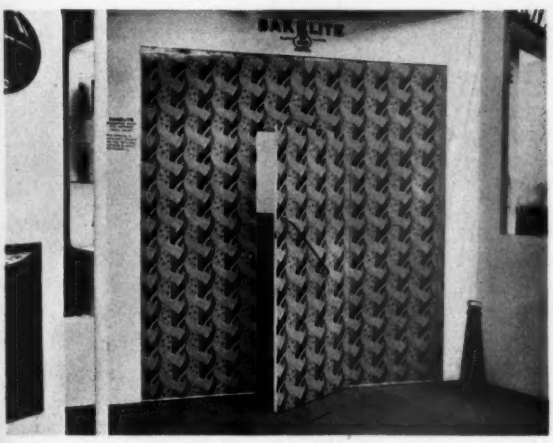
An interesting book has been issued containing general information and technical data on TUFNOL. A copy will gladly be sent to you on application to:

ELLISON INSULATIONS LTD.
PERRY BARR, BIRMINGHAM, 22

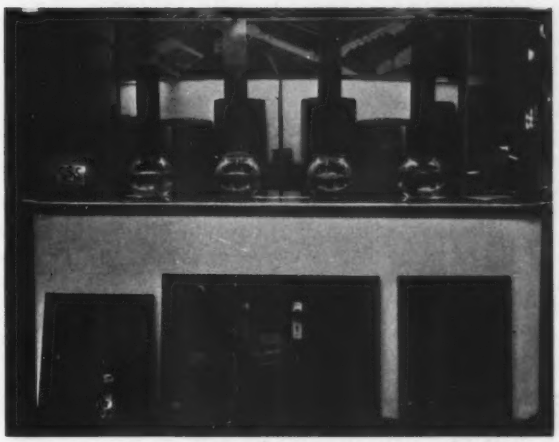
97

Everything for the ship's cabin. Ashdowns' stand at Olympia.

At Birmingham the stand of Ashdowns, Ltd., was more general in character.



The latest veneers of Bakelite, Ltd., proved a great attraction at Olympia.



Demonstration showing the great resistance of Bakelite varnishes to acids and alkalies.

and plates, hangers, handles, lavatory seats and bath fittings, wall panels and lampshades make the really only sensible substitutes for metal and wood. We were specially intrigued with the very beautiful and strong —here our powers of description fail. We do not know its trade name, but we refer to the perforated and rectangular soap and brush holder that rests on the two sides of a bath. A very fine piece of moulding work that deserves great praise.

As for the Birmingham exhibit, this was more comprehensive and showed a very wide range of this company's productions. As we have indicated before, this company was the pioneer, we believe, in constructing window frames and facia-boards. The exhibits showed some excellent examples of these and door frames, and in such beautiful colours that, if only motor-car manufacturers would co-operate more heartily with Ashdowns, Ltd., we feel sure that brighter motoring would be a real fact.

In addition, there were on the Birmingham stand a host of more mundane manufactures for the electrical and the aircraft industries, as well as a complete range of household fitments.

British Artid Plastics, Ltd. Olympia

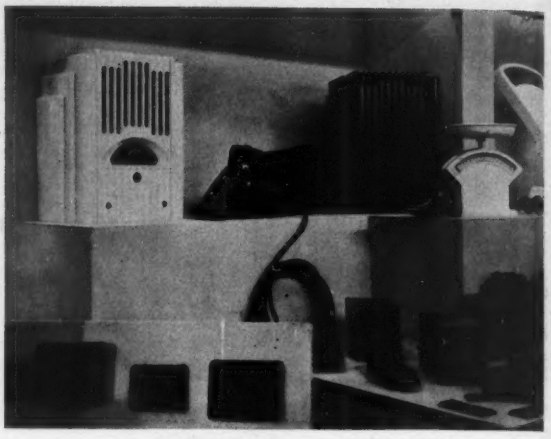
This concern, of which we have written so much during the last few months, was, of course, a newcomer to the Fair. In was the first occasion that the general public and even the remainder of the plastics industry were given a real opportunity of seeing the remarkable work that is now being produced at the Slough works of this company. What is important, too, is that the remainder of the plastics industry is not lacking in fulsome praise for this work—always a healthy sign. We were often asked how it was done, but we know as little as any outsider.

Things have moved apace since our last visit to the works, and orders are being received and executed with praiseworthy dispatch. The new process—we had limited our previous photographs to book covers and the like—has now entered, if not the industrial field, certainly the comestible one, as our present photographs readily portray. We were shown the reproduction of the Charrington plaque, with the Toby in different colours, and this is especially praiseworthy.

Bakelite, Ltd. Olympia and Castle Bromwich

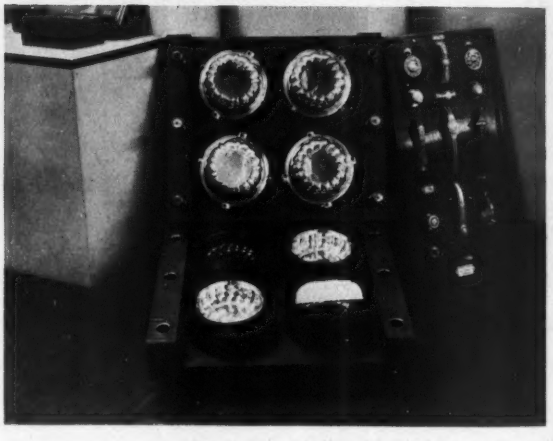
As on previous occasions, the stands of this company, no doubt the largest producers of synthetic resin in the country, portrayed the vast variety of goods made from their synthetic resins and the industries in which they are employed. So wide is their use in each industry that the exhibits can be sectionalized, and splendid collections of moulded goods employed by, say, the

The general view of the B.I.P. stand at Castle Bromwich.



Radio cabinets, hand.vacuum cleaners, etc., in Beetle and Scarab.

A lighter section at the above stand, showing lamp shades, cigarette boxes, etc.



The work of the die-making section of B.I.P., Ltd.

electrical, the motorcar and the aircraft industries can be gathered together.

We note with complete satisfaction the growing improvement in the production of laminated veneers by Bakelite, Ltd. A few years ago the designs available were strictly limited and consisted, in the main, of imitation wood grains. While admirable in many ways and conforming with a public demand, we have always hoped that this would be superseded by a new appearance or design more essentially plastic in character. The latest developments are as amazing as they are pleasing. We now have complete murals, consisting of artists' original drawings or photographic enlargements, as an integral part of Bakelite decorative sheet. On the London stand, as will be seen in one of the photographs here published, there were two large murals including doors in very striking designs and colours. A recently developed process enables enlargements of any original in colour to be reproduced.

Two other special exhibits were the colour-matching apparatus at Olympia and the interesting feature, in Birmingham, which consisted of an animated display illustrating the ability of paints, based on Bakelite resins, to resist chemical action. A number of fish bowls, filled with acid or alkali, stood on the main stand. Several metal plates, coated with these special paints, were automatically immersed and withdrawn from the solutions and showed no ill-effects.

The use of laminated materials in engineering was also adequately shown. Examples of modern bearings in this material and types of gears were on view.

British Industrial Plastics, Ltd. Castle Bromwich

This company exhibited on an island site in Birmingham, and in this divided the display into the products of the three constituent companies: British Industrial Plastics, Ltd., which fabricates steel moulds and dies; Beetle Products Co., Ltd., of Oldbury, which produces the synthetic resins and the Beetle, Pollopas and Scarab moulding powders; and Streetly Manufacturing Co., Ltd., Sutton Coldfield, where finished mouldings are produced from the above-named resin powders.

Thus this company has not only the advantage of displaying their own fabrications, but also exhibit a multitude of objects, utilized in dozens of industries, that are manufactured by their customers. These objects include radio cabinets, telephone parts, fan mouldings, electric-fire housings, model toys, lines for the cosmetic industry, soap containers, furniture and furniture fittings, etc.

As for Streetly's own exhibit, mouldings included electricity meters, fuse boxes, scale housings, trays, denture baths and sweet containers. Especially noteworthy were the lamps made from Beetle sheet for the Admiralty.

British Artid Plastics, Ltd., produces decorated book-covers and plaques.

The same company is now utilizing the process for more mundane objects.

One of the smallest mouldings here is of great interest and importance. It is a paint-holder for the small paint box—the tiny receptacle, some ½ in. square by ¼ in. deep, that in the old days was always made of porcelain. To-day it is made by Streetly in amino-resin moulding powder by the thousand, and is a much better product, cheaper and more accurately made than it ever could be in porcelain. In the mould-making section there was a large selection of these highly accurate pieces of plant, made at Tyburn Road, Erdington. The six-impression mould and die, used for manufacturing the well-known Beetle jelly mould, created much interest.

As in the 1938 exhibit, a fine selection of extruded rods were on show, as were examples of lacquers and glues made from amino-resins.

E. K. Cole, Ltd. Olympia

About a year ago we published an article describing the growth of the plastic radio cabinet, or, rather, the development of design in the plastic radio cabinet. At their B.I.F. stand E. K. Cole, Ltd., showed some dozen or so of the latest models of their cabinet, for which they are justly proud. The modern instrument is a fine piece of work, and more than most has this firm developed sound design.

As many readers know, this concern decided some two years ago to enter the industrial field and produce mouldings on their plant for outside inquirers. In view of their experience it was obvious that the large moulding side of the industry would receive a fillip. This has proved the case, for we have seen the advent of the Thermovent Heater and large table tops. Mouldings up to 12 lb. in weight, with dimensions showing a potential area of about 5 ft. by 3½ ft., can be produced on the Ekco plant. Naturally, manufacture has not been confined to large units, as the array of electric razor casings, switch cases, fuse boxes and bobbins on the stand showed.

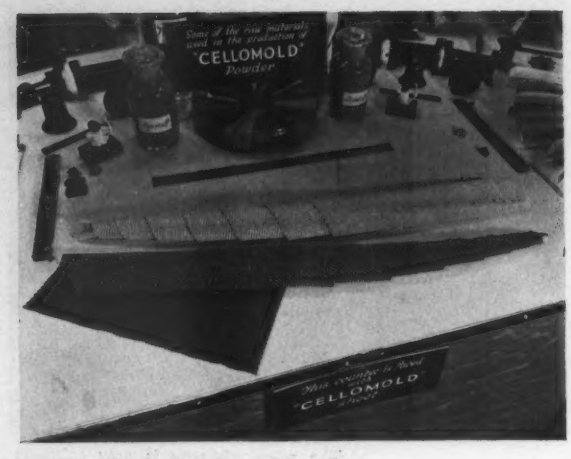
Combined Optical Industries, Ltd. Olympia

What a pity it is that the products of this firm are so difficult to photograph, but there is little result if we attempt to show a lens that is made from a material far more transparent than glass.

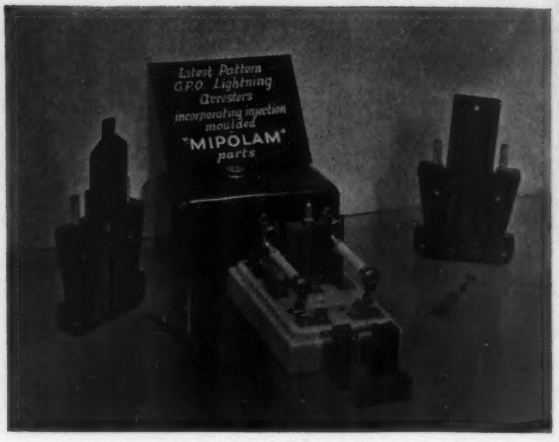
During the past two years the publicity given to this firm, and to the possibility of moulding glass-clear resins to make lenses, has thrilled the world, not merely because of the possibility of cheap, highly accurate lenses, which could be turned out at very high speed and without the necessity of polishing by highly skilled

Pretty Polly's Plastic Perch, by Crystalate, Ltd.

The "laminated" corner of F. A. Hughes and Co.'s stand.



Moulded "Cellomold" was used to form the base for this diamanté "cloth."



The above use of "Mipolam," the vinyl plastic made by F. A. Hughes and Co., is self-explanatory.

workmen, who scarcely existed in this country, but also because the company has become of national importance in times other than peace.

To-day the results obtained are fully up to expectation, and the new ophthalmic lens—known as the "Plasta" lens—is on the market.

"Plasta" lenses offer a number of outstanding advantages over glass lenses, particularly in the ophthalmic field. In the first instance, they transmit more light, are extremely accurate, and, being moulded from dies, are reproducible without the slightest variation. To the spectacle wearer they offer a degree of comfort and convenience hitherto unknown. The very low heat capacity and conductivity of the material from which they are made makes them proof against misting, an ever-present annoyance with glass lenses.

Further, the "Plasta" lens is a featherweight lens, being only half the weight of the corresponding glass lens.

Finally—and perhaps most important of all—there is the inestimable advantage of unbreakability. The "Plasta" lens will not splinter or chip, and it is given a hardness which renders it scratchproof under all conditions of normal usage.

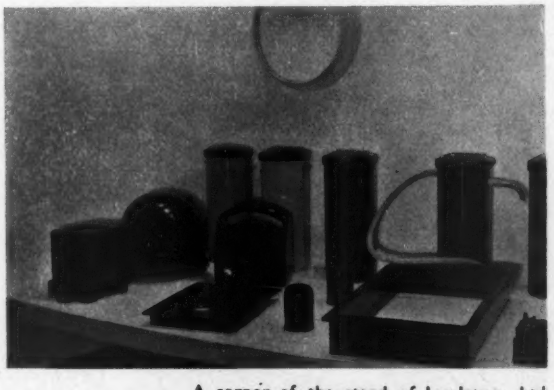
Crystalate, Ltd. Olympia

This company is a very good example of what might be called the heterogeneity of plastics and of moulding technique. When reporting on this stand it is not a simple matter to decide where to begin. Almost all types of plastic mouldings were on view, and almost all types of plastics are employed as the raw material—phenol and urea-formaldehyde resins for high-pressure moulding and cellulose acetate for injection.

In the 40 years of its existence Crystalate has spread its net wide, and supplies a vast number of industries with its finished goods; aircraft and telephones and the general electrical world consume the greatest proportion, ranging from meter cases, control knobs, switches and terminals, to bobbins and coil formers for the radio trade. Although this is probably the most important or, rather, largest consumer, vast quantities of ash-trays and cigarette boxes for advertising purposes, clock cases and display stands for cosmetics are also made. Excellent specimens of these were on view, as were also sets of dominoes and draughts for the amusement industry. Close examination of all these samples supports the remarks we have already made in an editorial with reference to the high precision and beautiful finish of the work.

The new works, near Tonbridge, are in full blast now, and expect to keep busy to capacity for many months to come. We always see something intriguingly amusing at this stand. Their latest effort is a delightful little musical cigarette box that breaks into song at the slightest opportunity—at least, on pressing a button. Crystalate also moulded fitments for the Flash-heat, a heater which boils a cup of water in 30 seconds!

"Mipolam" in the form of sheet and extruded tubes. F. A. Hughes and Co. are now manufacturing the raw material.



A corner of the stand of Insulators, Ltd. Noteworthy are the water softeners and the square-shaped refrigerator component.

Crystalate, Ltd., made the electrical connections for the 30-second heater—

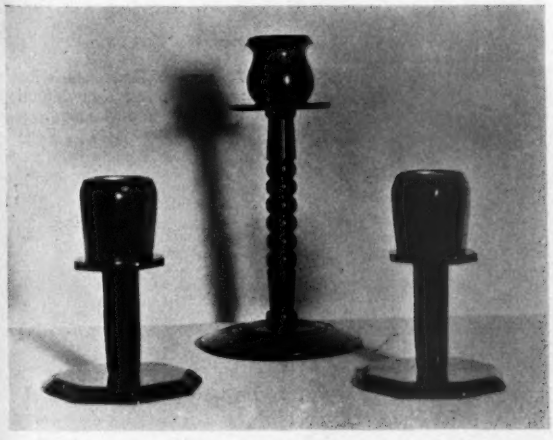
Dap Manufacturing Co., Ltd. Olympia

As we indicated in our last issue, the exhibit of this company's stand was confined to one special application in the building trade, namely, extruded plastics in the form of rods and tubes of various cross sections suitable as curtain runners. Many different forms of these were shown, a special double runner being available for A.R.P. work, carrying two slots for anti-gas curtains. We were informed that, so great has been the interest on the part of builders, that another exhibition will be held shortly in Manchester.

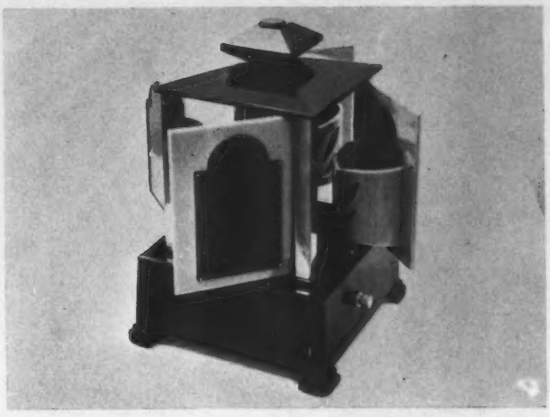
Ebonestos, Ltd. Olympia

Last year the chief attraction at the stand of Ebonestos, Ltd., was the 30-mile-an-hour sign moulded out of Diakon. We were interested to hear that this has been generally installed on the Kent county roads with great success.

This year the great attraction—at least, to us—was the continuous impregnated fabric strip that hung in spiral form from the roof of the stand. While, in itself, such manufacture is merely an extension of the usual dipping, drying and curing processes normally employed in making laminated goods, yet this is especially noteworthy as it opens up yet another outlet for plastic materials, since the strip can be not only flat, but curved or even angular. Thus, with such a very tough material, we foresee its use for table edgings, especially for counter and restaurant table work. Since it can obviously be readily curved, the potentialities of such a material are extremely great. We shall watch this development with interest since it opens up new avenues for plastics.



Erinoid, Ltd., showed its medals with these beautiful "tortoiseshell" candlesticks made from Erinoid—



—and also moulded the whole of this musical cigarette box.

Erinoid, Ltd. Olympia

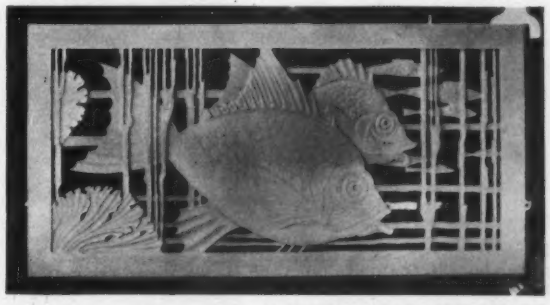
This company is an excellent example of how scientifically conducted works move with the times. Many years ago it became one of the foremost manufacturers of casein plastic and developed a trade that is now world famous. Since those far-off days plastics have changed. So have the productions of this concern changed with the times, for now there is produced not only a cellulose acetate moulding powder, sold under the trade name of Erinofort, but also there is a new plant manufacturing transparent foil. A special corner of the stand was relegated to this material, the samples being of superfine quality.

We have already often mentioned Erinoplas, the new cast resin. One of the most beautiful exhibits in the whole plastics section was a carving in the form of a grille or plaque with a marine subject.

But to revert again to casein, which in these days of fierce competition is little in the limelight. Erinoid, Ltd., exhibited a number of candlesticks made of Erinoid in imitation tortoiseshell. So beautiful in colour and design are they that we cannot imagine that they can be better in any of the newer plastics.

F. A. Hughes and Co., Ltd. Olympia

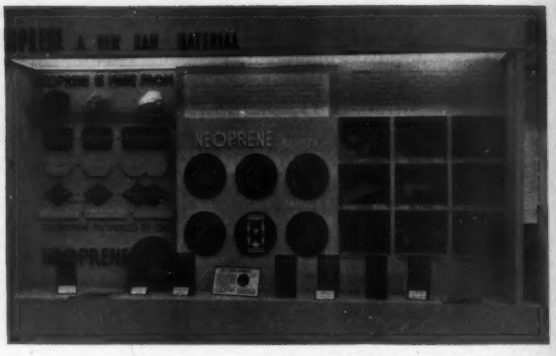
This concern, although essentially raw material manufacturers, makes no exception to the general rule prevalent in the plastics industry, this rule being to produce something new for the world at, roughly, yearly intervals. Last year saw a high peak in the development of Mipolam, a vinyl chloride polymer, which this company is now making on a commercial scale at Feltham. This year we note two interesting develop-



—and this magnificent plaque which was cast from their new phenol-formaldehyde resin Erinoplas.

One of the most significant of exhibits was the continuous impregnated strip on the stand of Ebonestos, Ltd.

Erinofort, the cellulose acetate made by Erinoid, Ltd., has a wide range of uses.



I.C.I.'s Neoprene exhibit in pictorial form at Birmingham.

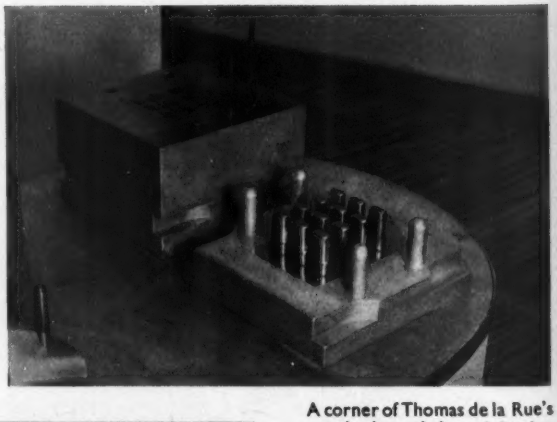
ments, which are also described elsewhere in this issue—a phenol-formaldehyde resin in liquid form, suitable for casting, and a similar resin in a soft powder form, which lends itself to hand and tool modelling without hardening. Curing is subsequently attained by heating.

The stand of F. A. Hughes and Co., Ltd., contained a vast number of examples of objects manufactured from Rockite, their well-known thermo-setting resin, and from Cellomold, the cellulose acetate moulding powder. Of special note amongst these were a number of aeroplane models of amazingly accurate duplication and a diamanté "cloth," the "cloth" being moulded from Cellomold.

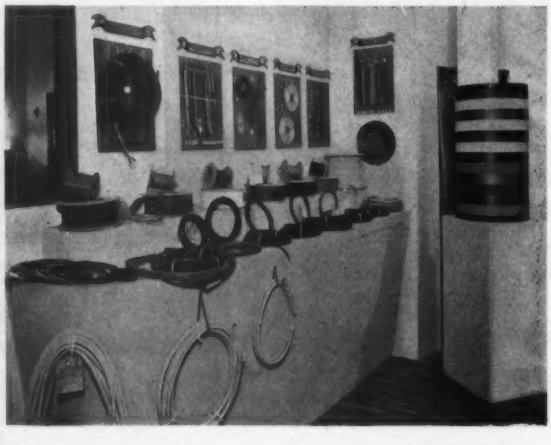
Hydro Plastics, Ltd. Olympia

This newcomer was very welcome to the Fair, for it brought such a new series of plastic manufactures into this country as to constitute, in themselves, a small industrial revolution.

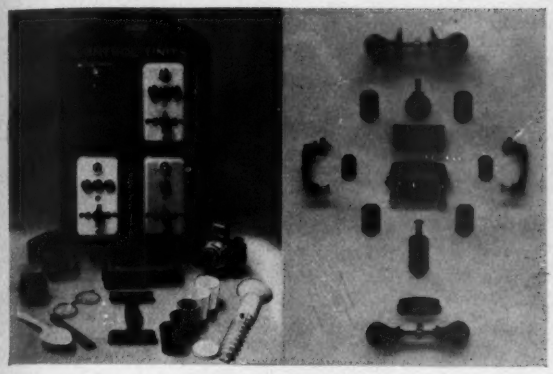
In our last issue we described the manufactures in great detail. The variety of tube produced in vinyl chloride resin is as amazing as the plastic itself. Of special interest to the electrical industry, the cables were shown in a bewildering variety of shapes, sizes, colour and transparencies. Moreover, there is every possibility of the application of such extruded tubes and strips extending to industries quite outside the electrical industry. They are, obviously, applicable to the manufacture of shoes, hats and other decorations.



A corner of Thomas de la Rue's stand showed how injection moulding is performed.

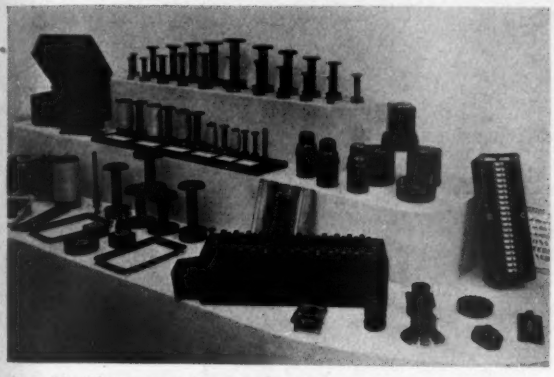


Hydro Plastics, Ltd., is a newcomer, but their extruded tubes and strips of vinyl plastic was one of the most important exhibits seen.



(Left) At Birmingham, E. Elliott, Ltd., showed a great variety of moulded goods. (Right) Door furniture by Ashdowns, Ltd.

S. O. Bowker, Ltd., make a colourful range of switches.



Kent Mouldings specialize in electrical goods, textile bobbins, etc.

One firm in Birmingham had the good taste to show a complete range of utensils with Catalin handles.

Insulators, Ltd. Olympia

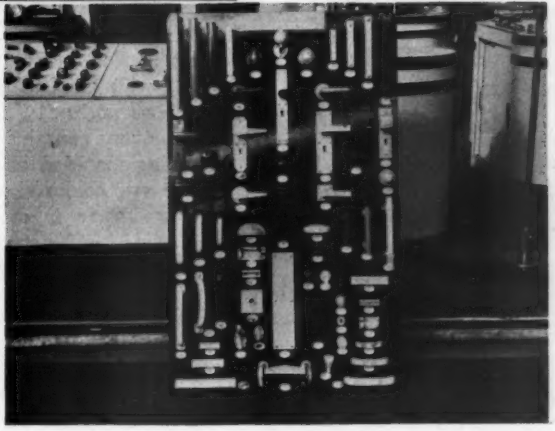
One of the most interesting points discernible in the plastics industry, especially with regard to the high-pressure moulding side, is that although theoretically and practically one can often make exactly the same mouldings as another, yet we can always find something entirely new at each stand and which, in a sense, is quite different from any other. Here, for example, perhaps the outstanding moulding was the "Sussex" water softener, and is the only softener in the country, we believe, that has been moulded in synthetic resin. This is indeed a great achievement over metals. This company would also appear to concentrate, in addition to other things, on novelties for industrial firms.

Thomas de la Rue and Co., Ltd. Olympia

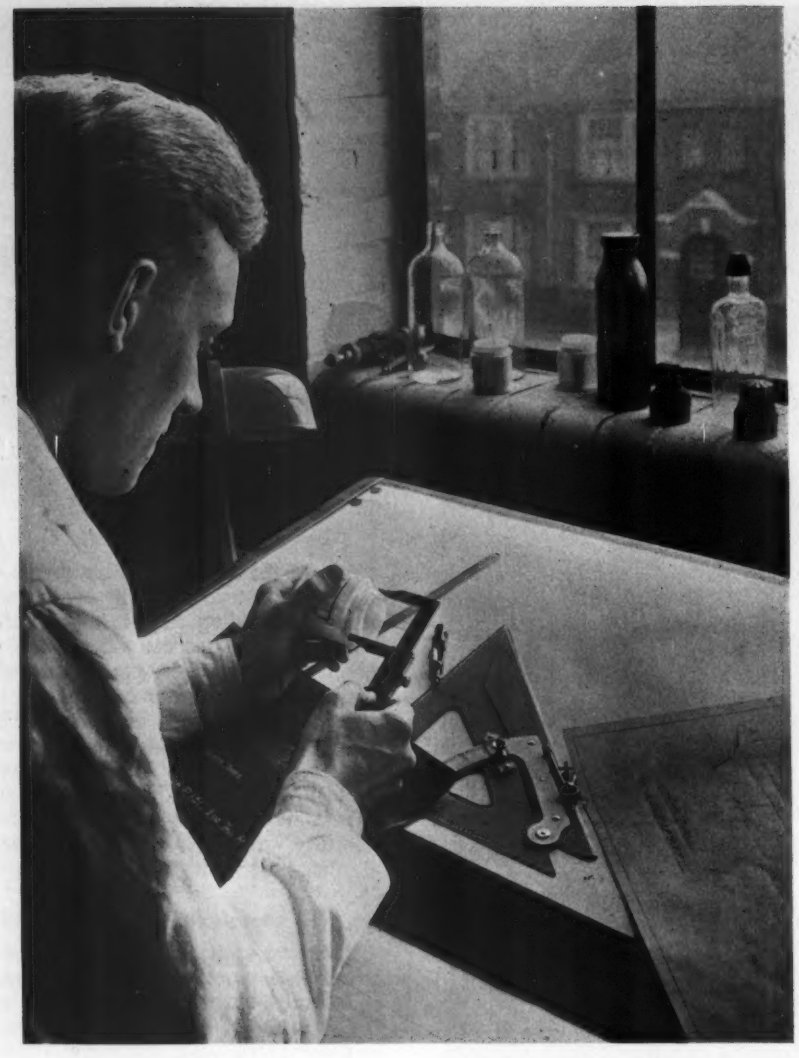
The corner site of this stand was full of colour, for the face was almost entirely occupied by an exhibit of coloured telephones, red, green, cream and black.

This is one of the largest of the moulding companies in the country, and although some of the large sizes for which it is well known were not shown, yet there was an excellent range of goods which are supplied to almost every industry—table tops, radio cabinets, hair-driers, electrical equipment, cameras, etc.

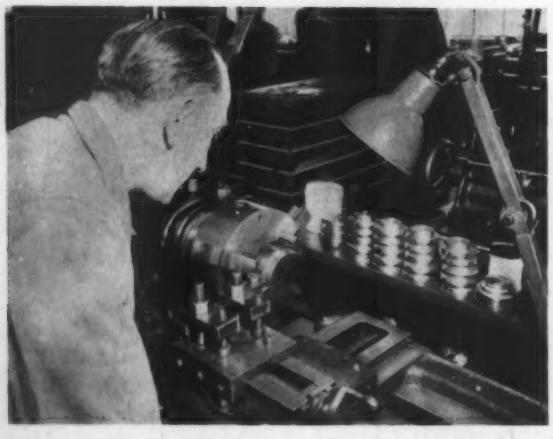
An excellent example of another type of moulding was shown in the injection moulding dies used for producing those tiny face-powder shovels that are now sold in almost every druggist's shop.



Evered, Ltd., who concentrate on door furniture, showed a wide range of these objects at Castle Bromwich.



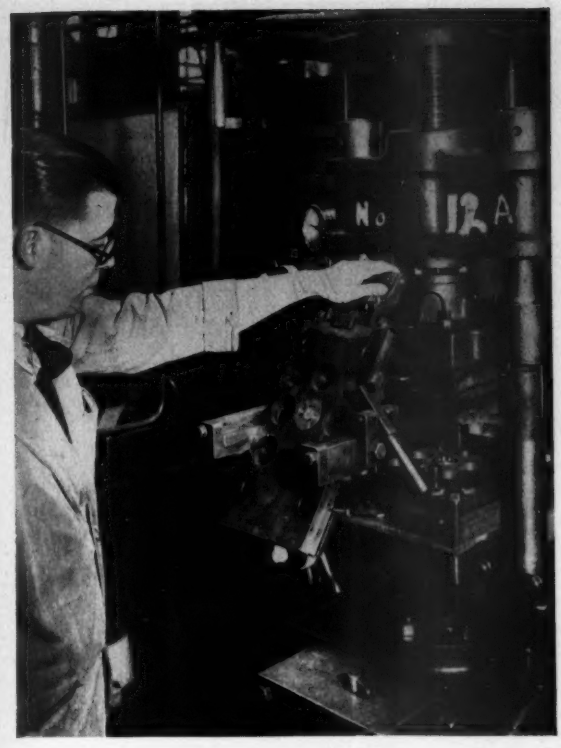
WHEN THE CAP FITS



Turning the moulds on a lathe in the engineering shop at the works of Kork-N-Seal, Ltd., Charlton, London.

THE watchword of the bottle-cap industry is accuracy, and all the various processes of manufacture are designed to ensure that the finished cap will really fit the container and effectively seal the product. One of the most progressive companies in this line of business is Kork-N-Seal, Ltd., which company is an associate with the United Glass Bottle Manufacturers, Ltd., whose works at Charlton, Kent, are organized to turn out every conceivable type of closure, from the unassuming moulded cap for tooth-paste tubes to the elaborate and colourful holders for shaving sticks.

The first stage in moulded-cap manufacture takes place outside the factory. An idea is born in the mind of a customer, who may produce face cream, pickles or shoe polish. He makes contact with the sales side of Kork-N-Seal, Ltd., and puts forward his requirements. Then follows great activity at the factory, where drawings are prepared by the draughtsmen and, later, ebonite models made, so that the customer can see for himself what his cap will look like. Possibly



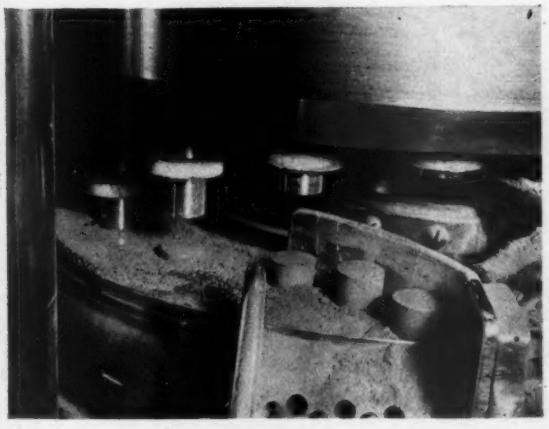
Sampling the tool and material on a sample press. The finished moulding is checked up with original drawings and submitted to the customer for his approval.

Weighing pellets so as to ensure perfect uniformity of weight and size.

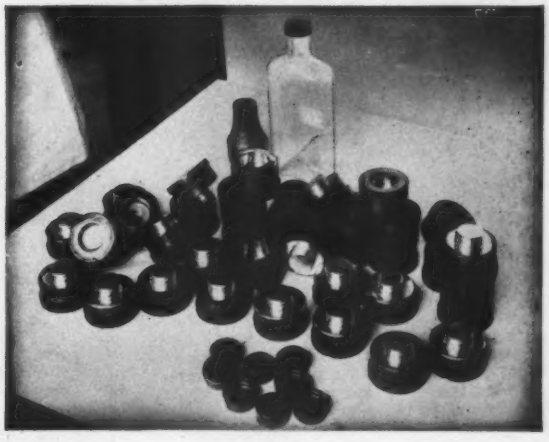
this first model will require slight alterations, or, maybe, it will meet with the buyer's immediate approval. In any case, the next stage in the genesis of a successful cap is again the drawing office, where the actual container is checked against blue prints of the finish and drawings are prepared for making the tools to produce the moulded closures. Extreme accuracy has to be maintained in preparing these drawings and due allowance made for the maximum and minimum tolerances for the bottle finish. Calculations have also to be made for the contraction of the plastic material after moulding, so that the cap will fit properly and screw home tightly and yet without any undue strain, which may cause the material to crack. Careful thought has to be given to the thickness of the moulded section which will give the maximum strength for the minimum cost.

Most of the faults of moulded caps are due to the inaccuracy of the thread finish, which causes continual trouble to the customer, especially as in many cases he is now using fully automatic capping machines, which are thrown out of action if the dimensions of the caps or bottles exceed certain specified figures. It should be realized that when these capping machines get jammed it causes a considerable amount of inconvenience. Bottles are smashed and the whole machine has to be cleared, washed down, dried and restarted. All these operations slow down production.

The customer's product is tested out in the laboratory to ascertain the most suitable powder to use for moulding. This is not a fad, but a most essential step in production and ensures that the cap will not be affected by the contents of the container. The powder



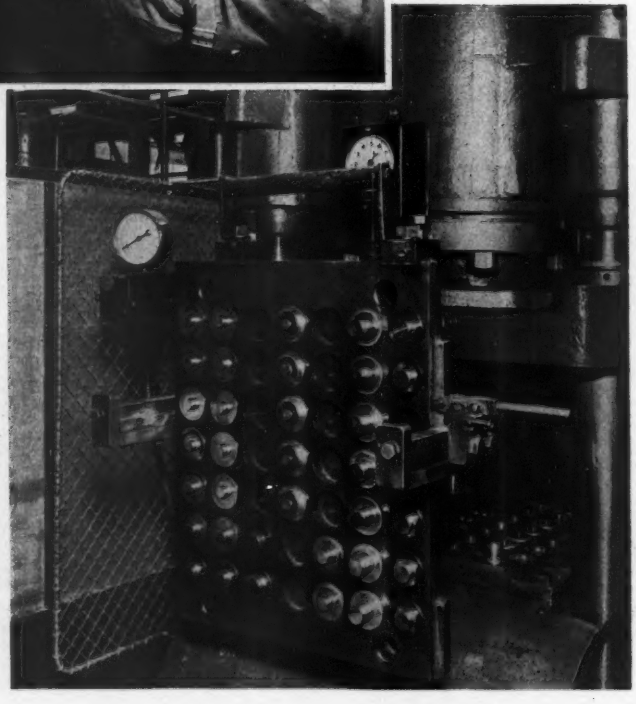
Pelleting on a modern Wilkinson pelleting machine.



A group of impressions for moulding bottle closures.

This multi-impression mould is able to produce 49 mouldings and is one of a battery in constant use to fulfil the large contracts of Kork-N-Seal, Ltd. The operator is unscrewing the finished mouldings of white amino resin.

Loading a press for the moulding of shaving-stick holders. It takes exactly two pellets for each holder and these are arranged on a specially designed tray, which is provided with holes corresponding with the impressions in the actual press.



Typical mixed bolster which has been cleaned prior to loading. The utmost care is taken to ensure that the dies are kept scrupulously clean, so as to produce perfect mouldings. On the left is a safety gate to prevent accidents when the press is in operation.

chosen must also be able to withstand any special process which the cap may have to go through at the customer's works, such as sterilization at temperatures above 100 degrees C.

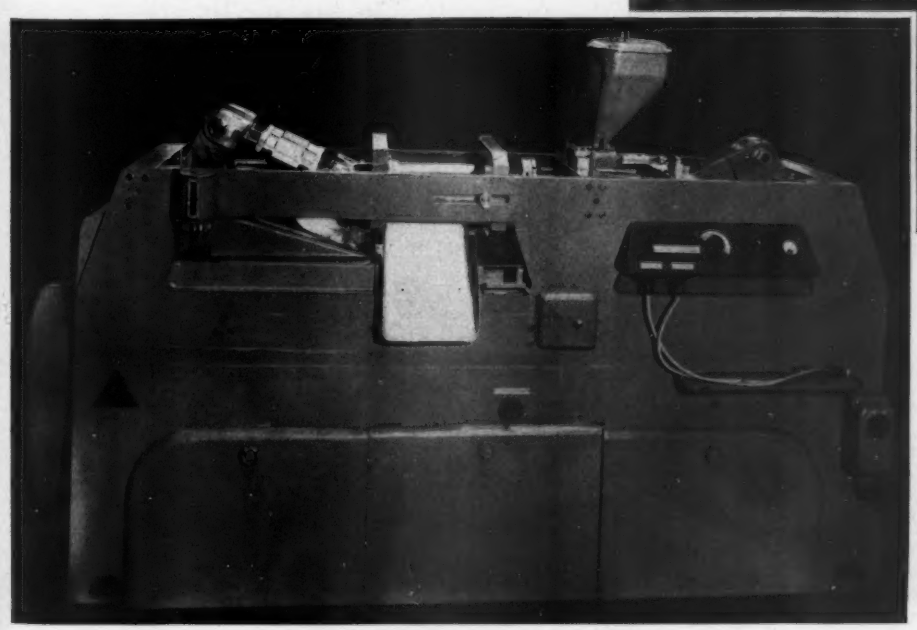
One impression and one pin are then made and the job sampled in a sample press. This is checked up with original working drawings and submitted to the customer for approval. If it is correct, an order is placed for the requisite number of tools to produce the caps in the required time.

Meanwhile, the shape and weight of pellet required to mould the closure is ascertained and when the tools are ready the pellets are produced by means of one of the latest Wilkinson machines and moulding carried out. The flash is removed from the mouldings, which are afterwards polished, finished as required and the necessary liners inserted. Before sticking in the liners the customer's product is again tested to determine the most suitable material; this may be cork, tinfoil, Resistol, rubber, etc. Caps are finally inspected and packed in layers in cartons. One of the latest developments at the Charlton works is the installation of Eckert and Ziegler injection moulding machines to turn out caps for collapsible tubes containing tooth paste. These caps are all fairly small and, indeed, it is not so far economical to manufacture the larger type of closures in cellulose acetate.

At all stages of production the closures are taken from operators and tested on steel gauges to check up on their accuracy in relation to the maximum and minimum tolerances for the bottle finish. Near enough is no use for Kork-N-Seal, Ltd., who have set an extremely high standard of accuracy and are concerned not merely in fulfilling orders, but giving complete satisfaction to the various industries who constitute their customers.

Inspection and packing of finished mouldings.

Polishing bottle caps.



Eckert and Zeigler injection moulding machine which will shortly be in operation at the works for moulding small bottle caps of cellulose acetate.

Ideas—

By the EDITOR

Presentation Gifts

Messrs. David Brown and Sons (Huddersfield), Ltd., the well-known engineers who produce the "Radicon" worm reducer, which has already been described in this journal, send me an example of a model in plastics of the worm reducer which they send out to friends. As will be noted, it is an exact model and can be used as a paper weight and cigarette box. It has been moulded for them by Insulators, Ltd., Leopold Road, London, N., and has been reproduced in phenol resin in a battleship grey.

What pleases me most about David Brown and Sons' letter is that, although they are not moulders but customers of the plastics industry, they have gone to the trouble of telling us how pleased they are with the model and say: "It occurs to us that you may care to publish a picture of this for the benefit of other readers who may be contemplating similar advertising novelties."

May the plastics industry be blessed with many such customers! Such co-operation is as rare as it is acceptable.

She Trippeth Lightly

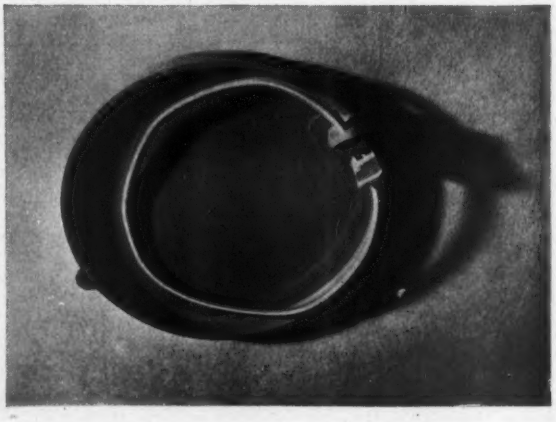
I am willing to bet (sum not stated) that the shoe industry has never before produced such striking examples of their ware as have now become available. I admit they must have dreamed about them before, but only because Cinderella is presumed to have worn glass slippers. But that was all my eye and Betty Martin. They would never have stood up to even the fairy weight of Cinderella.

To-day, Enzel, the well-known *bottier* in the Rue du Fbg. St. Honoré, Paris, is producing sandals and shoes

of Rhodoid, the well-known cellulose acetate. The results are not only beautiful shapes as transparent as glass, but they are also strong enough for ordinary wear. They have a long life, too, although the length of time shoes are nowadays worn before a new fashion ousts them is not exactly computed in years.

Jam Jar Lids

Here is an idea, carried out in plastics, that has long been overdue for the housewife, and for the standard 2-lb. jam jar. The ordinary jar has no screw top and varies slightly in size. At present there is nothing available which can be used as a tight-fitting lid and which, at the same time, can take care of the aforesaid variation in sizes produced by the various glass or pottery firms.

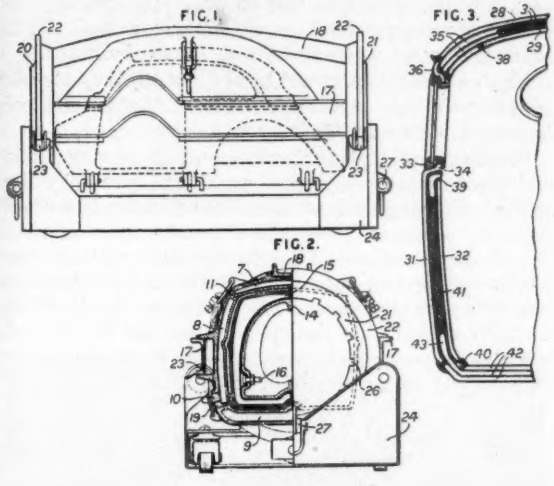


The action is more or less self-explanatory. The spring steel ring is clipped round the neck of the jar and a positive closure is given by the pressure between the moulded lug at the back and the opposite portion of the flange. It should be noted that the circular flange itself is a loose fit on the jar. This must necessarily be so, owing to the possibility of fairly wide variations.

London Moulders, Ltd., of India Works, Exhibition Grounds, Wembley, are producing this article. We wish them every success with it.

Moulded Motorcar Bodies

I have already in these pages given my own views and those of motorcar manufacturers on the possibility of moulding vehicle bodies. We also pointed to Germany as being the only country where such experiments were being considered, mainly because of the desire to utilize synthetic materials in lieu of metals. The latest news comes in the form of a patent which is of sufficient interest to be included here, instead of being relegated to the end of the journal. The Auto Union Aktien Gesellschaft have been granted the use



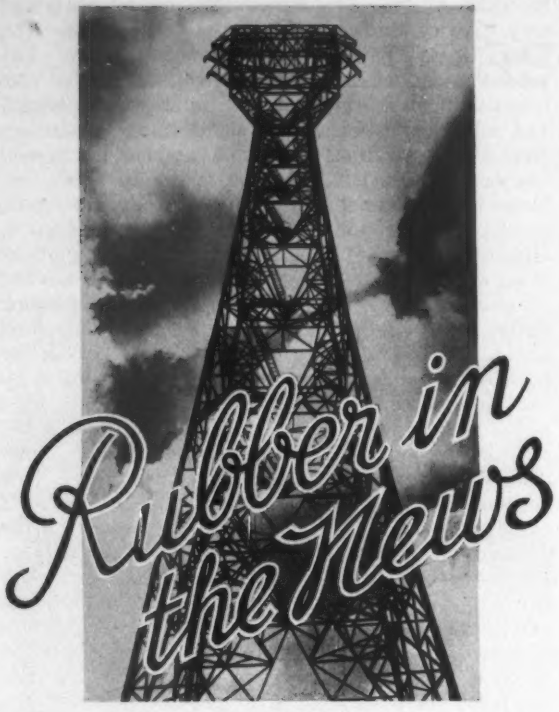
of English Patent No. 492,630 and, as will be seen, the raw material is not a moulding powder, but, as we had foreseen, a fabric or similar material impregnated with resin and then shaped. Here is an abstract:—

A vehicle body comprising preformed units of synthetic resin saturated material and preformed reinforcing members of similar material is formed by assembling the parts together in a casing, with adhesive applied at the joints, and applying heat and pressure to cause the adhesive to unite with the adjacent parts, the body so formed being then allowed to cool. As shown in Fig. 3, the roof 3 consists of members 28, 29 of identical shape formed preferably of superimposed paper strips, shavings, clippings, etc., saturated in synthetic resin and pressed and cut into shape, the roof being connected to the sides which comprise walls 31, 32 of similar material, by means of distance pieces 35 projecting between the members 28, 29 and walls 31, 32. A flange 34 on the walls 31 receives a window-frame 33 and along the top edges of the window aperture reinforcing strips 36 are provided with which the necessary window-frame parts are formed in the pressing operation. Between the members 28, 29, distance pieces 35, and strips 36, is interposed adhesive 38 which fills the gaps between the various parts and may have embedded in it paper or fabric strips. The other joints, e.g., 39, 40, are formed similarly. The space between the inner and outer surfaces is filled with material such as cardboard or bullet-proof material. The solid floor is formed by plates 42 and a distance piece 43. The various parts are assembled in a mould-like casing, Figs. 1, 2, the inner surface of which conforms to the outer surface of the car body, the casing comprising a top and front portion 7, side portions 8, and bottom portion 9, each of which is hollow, parts 10 being provided in the outer wall for connection to a hot air or steam supply, the portions inter-communicating through passages 11. The portions 7, 8 are mounted on and guided by U-section girders, 18, 17 and the bottom portion 9 is secured to the side portions 8 by clamping means 19. The outer members 28, 31, etc., of the body are first inserted in the casing 7, 8, 9, the outer distance pieces 35, frame members 36, etc., inner distance pieces 39, 43, etc., and fittings are then positioned on the outer members, the adhesive 38 having been applied previously to the positions for the joints, and finally the inner members 29, 40, 32, etc., are placed in position, the joints being plastered with adhesive. A pressure-applying unit 14, enveloped by an inflatable bag 15 having an inlet orifice 16 and made of rubber-impregnated fabric which adapts itself to the internal shape of the body, is then inserted through the floor, door, or roof aperture and steam or hot air is introduced into the portions 7, 8, 9 and simultaneously, under pressure, into the bag 15, causing the adhesive to melt and mould into the required shape. Finally, the steam, etc., is discharged and cold air pumped in to cool off and harden the adhesive.

Table Legs

While hunting round the B.I.F. exhibits I noted on the stand of Ebonestos, Ltd., a moulding that is very worthy of comment. The photograph below shows a very ornate moulding for the top end of a table leg (I don't know its technical name), and is one that amply shows how complicated modern mouldings can be. It is, of course, made on a "split" mould, but we can reasonably imagine that such a piece of work would have been quite impossible, say, 10 years ago. The detail in the "sculpting," which appears to include a good deal of undercutting, is very remarkable.

Readers must not take this to indicate my approval of what is certainly not an example of modern art. It is an example of what can be done if the customer wants it.



★

The 1937-1938 Report of the Department of Scientific and Industrial Research has just been published and contains more information regarding the rubberization of wool. Considerable quantities of various types of wool yarns have been treated for members by the Wool Industries Research Association in order to test the properties of fabrics made from them. The treatment has proved advantageous for various types of woven and knitted fabrics in which resistance to wear or avoidance of the objectionable "balling-up" which may result on wearing surfaces of garments made from loosely twisted yarns are matters of importance. The resistance to wear of carpets also appears to be greatly improved.

★

Linatex is the registered trade name of a special form of rubber, which is manufactured in sheets in British Malaya from fresh rubber latex by a process developed by Mr. Bernard Wilkinson, who is the Managing Director of Wilkinson Rubber Linatex, Ltd., and Director of concessionnaire organizations in this country and abroad. The process of manufacture preserves the amorphous structure of the rubber as no heat or drastic milling is used, and imparts other qualities peculiar to the material.

Although Linatex sheets can be made only at the Linatex Works in British Malaya, substantial stocks of the material are maintained in most countries of the world, where also are skilled engineers trained in the fabrication and the applications of the material.

Linatex has been well known for over 15 years in the mining fields of the world, but only during the past two years have its peculiar properties been proved to be of great service in aircraft construction. The manufacturers in this connection are indebted to the technical staff of Short Brothers (Rochester and Bedford), Ltd., for their close co-operation in the development of applications of Linatex to the Empire Flying Boats. Subsequently the leading aircraft manufacturers in this country have developed the use of Linatex extensively to solve many problems in construction.

The following properties are claimed by the makers:—

Linatex will not perish under any climatic conditions, even in prolonged storage in the tropics. It does not harden at temperatures as low as −90 degrees C. It is from three to four times more resilient than other rubber, is non-absorbent of moisture and light in weight (specific gravity 0.97). Linatex has greater resistance to abrasion than any metal—a fact well known in the mining world, where for years it has replaced special alloys in abrasion-resisting problems.

Probably the most interesting and useful feature of Linatex is the ease with which it can be cold-cemented together, a property, its makers claim, peculiar to Linatex. Complicated sections and forms can thus be built up without expensive moulds. The wide variety of special sealing strips which the company has evolved can readily be butt-jointed to form annular rings. This simple cold-cementing is readily done by the mechanics during assembly. By the use of other cements Linatex can be bonded to metals, wood or fabrics.

The material is unaffected by contact with Vaseline, wax, alcohol, glycerine and so on. It is resistant to most acids except those of an organic nature. It is unaffected by sea water and a wide range of alkalies.

Linatex is fully approved by the Air Ministry for use in aircraft (see "Aircraft Design Memoranda of Approved Materials 275").

Because of its high rubber content, Linatex swells in prolonged contact with petrol or oil unless held by the method of fixing such as where the Linatex is riveted or bolted between plates. To overcome such swelling the company developed an oil-resisting paint of grey colour, which will successfully withstand intermittent contact with petrol or oil. Nevertheless, the long life normally expected of the material will not be realized where it is exposed to continual contact with these liquids, particularly at elevated temperatures.

★

The experience of the L.P.T.B. with rubber rear wings for their buses has so far proved very successful. Five thousand buses have been equipped with these wings, and no doubt other vehicles belonging to the Board will be equipped with them from time to time. Although it cannot be claimed that the use of rubber rear wings will minimize the loss of human lives, in some accidents they have, at least, lessened the extent of injuries. The Dunlop Rubber Co. have done a great deal of pioneer work with this new application of rubber, and they are now reaping the benefit of several years of costly experiment and research.

★

A new and interesting use for Neoprene has recently been found for making the washers or gaskets used in glycerine recovery plants. Glycerine has a deleterious effect on natural rubber compositions and the use of synthetic rubber ensures freedom from leakages and the possible stoppage of the plant. Neoprene is also being used in place of rubber for packing and jointing work in other special industrial plants and it is recommended wherever natural oils and solvents are likely to come into direct contact with the packing material. Synthetic rubber may, of course, be used in association or incorporated with asbestos fibres which are commonly used for jointings and packings.

★

As mentioned in our January issue, latex, in conjunction with cork and other materials, is now finding several important applications in the boot and shoe industry. A new use for this rubber product is given in a recent patent, B.P. 476,137, taken out by Atlas Ago Chemische Fabrik Akt-Ges. Inserts for orthopædic shoes are made from a mixture of cork meal and rubber latex, which has been dried and subjected to a pressure sufficient to eliminate plasticity at the ordinary temperature. A single pressure at an elevated temperature, or a number of pressings at ordinary temperature, may be employed. Pieces of the compressed compound may be stamped from sheet, stuck to leather and ground to shape, or the cork-latex mix may be moulded between dies under the requisite pressure.

★

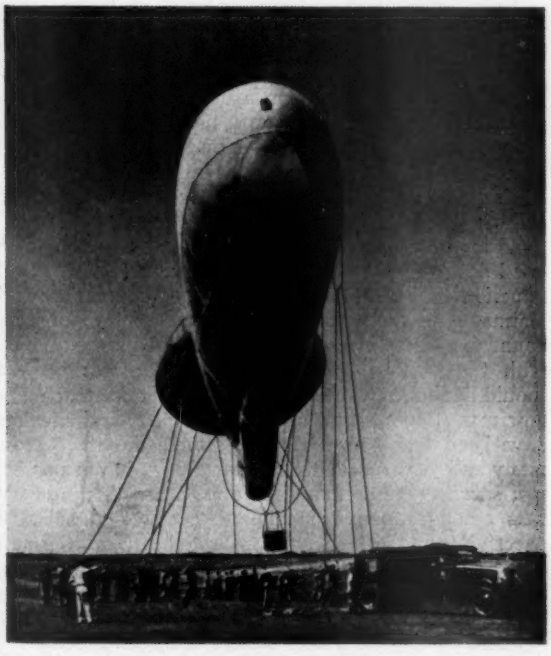
We have just received information from the Hercules Powder Co., of Wilmington, Delaware, U.S.A., that much of the exterior painting of the New York Fair is being carried out with their chlorinated rubber. The site of the Fair, which opens on April 30, is three miles long and a mile across the widest point. The total cost is estimated at $150,000,000, of which the Fair Corporation will expend about $50,000,000 on construction and operation. The Central Mall, with its sculpture, exhibition halls, cascaded fountain pools, magnificent lighting effects, etc., will cost $60,000,000. It is a great compliment to chlorinated rubber that it should be chosen for reasons of durability and economy as the decorative medium. To paint acres of exterior walls, basins for fountains and lagoons with huge murals of brilliant flat colours, at a cost consistent with the impermanent character of most of the construction, is no easy assignment. The surfaces to be covered are plaster, stucco, concrete and asbestos-cement materials. The necessity for speed sometimes requires application before the surface is thoroughly dry, but chlorinated rubber finishes do not suffer even when this drastic procedure is adopted.

★

Elastic fabrics are now being extensively used in the textile trades, and a recent patent, B.P. 495,539, describes a new and quite promising production process. Fabrics having a high extensibility in all directions are made by treating the fabric in unstretched condition with a liquid containing a wetting agent and a shrinking agent to diminish the sizes of the pores, and then spraying with rubber latex in such a manner as to avoid sticking together the elements of the fabric. The latter may be woven, knitted, braided or plaited.

★

In the first issue of the *Neoprene News*, published by I.C.I., a number of new uses are given for Neoprene. These include flexible pipe for carrying petrol or conveying lubricants to a machine; printing rollers and blankets, which are completely immune to the continual action of all oily substances. Neoprene mountings are also used for machines that get hot and spread oil around and where it is impossible to utilize ordinary rubber ones which will absorb vibrations efficiently. In the manufacture of heavy waterproofs for firemen, Neoprene proofing is now used, as experience has shown the synthetic rubber to give better service than natural rubber in hot places. Neoprene-coated propellers drive ships through silt-laden waters or pull air liners through dusty, sun-soaked air. In engineering yards, road-making work or open-cast mines rubber pipes and cables are exposed to sunlight and oils. The combination of these two enemies of rubber is quickly fatal unless Neoprene pipes or Neoprene-sheathed cables are used.



Neoprene-coated balloon cloth not only keeps hydrogen, helium and other gases "inside the bag," but also resists the deteriorating effects of sunlight and oxidation in outdoor service or in storage. Neoprene improves the serviceability of many inflated products and is now being widely used by the American Air Force.

Rubber ice-trays, nursing-bottle nipples and other products of personal use can now be made as transparent as the rubber sheet pictured here. Such articles must be free of odour and taste, two very necessary qualifications, but quite within the range of possibility for manufacturers using the new special rubbers.

PRODUCTION

Practical Information dealing with Raw Materials, Moulding and Forming of all types of Plastics—Thermo-Hardening and Thermo-Plastic—Works-Organization, New Plant and Control Apparatus

NOTES AND COMMENTS

Modern British Machinery

ONE of the most instructive lectures we have listened to for a long time was given by Mr. Beard, of British Industrial Plastics, Ltd., on the subject of the future developments of the moulding industry. Being of an extremely practical nature, Mr. Beard did not delve into fantastic theories and hopes, but made merely and more soundly a five-year forecast. It was, therefore, all the more readily debatable by his hearers.

We shall not discuss here the paper as a whole, for it will appear eventually *in extenso* in the *Journal of the Institute of Plastics Industry*, but there are one or two points which we should like to mention that seemed very apposite at the present time. In fact, they had little to do with the future of moulding, but with present action. This first we mention by the way, but it is important. It is the tendency, on the part of moulders, to make multi-impression moulds as "multi" as possible, with the idea that "if I make a 24-impression mould, instead of a 12-impression mould, I shall be doubling my output." This is not so, unless the machine is purely automatic. Twenty-four loads of powder have to be put in by hand and 24 pieces of finished mouldings have to be extracted by hand, so that two men, one on each side of the mould, are often seen busily unloading. Now, since the moulding process is essentially a mass-production job, the introduction of more man-power can reduce the whole system to an absurdity and can create quite an uneconomic condition. It would be as well if workshop managers examined this situation.

The second point that was raised by Mr. Beard was the strange position of this country with regard to the production of machinery in a special section of the moulding industry—injection moulding machinery.

It would appear strange that although for the moulding of thermo-setting resins we have an adequate supply and range of British machines and most works use British machines, yet there does not appear to be, on the market, a British injection machine for the moulding of the thermo-plastic material. It is true that a few simple "home-made" ones are seen here and there, but, otherwise, the modern type are American or German and very marvels of ingenuity they are too. The latest machine we have seen (incidentally, an automatic rotary moulding press for thermo-setting resins and not thermo-plastics) is now on the market. The Lauterbach is the answer to many a prayer.

Now, the point raised was not one of Free Trade or "Buy British," a system which, for this country, can be as dangerous as it is appealing on the surface. The point seemed to be: Has our engineering ability diminished with the years or, perhaps, have we any engineering imagination? Certainly in many ways we lag behind other nations and seem to follow their lead.

As for lack of engineering brains in this country, we do not believe this to be true. Neither did Mr. Beard, in fact. But we fear one of the audience, who appeared to resent the possibility of inferiority of British brains, gave the game away by stating that there was not the market for such type of machines and that it was not worth while for the British manufacturer to make them. He further capped his argument, which gave the game away still more, by saying that he did not see why the British manufacturer should experiment, when he couldn't see a return for his "brass."

There seems to be a lot of nonsense in such a statement which, on the face of it, seems full of the old type of "horse-sense." We think the trouble is lack of imagination, lack of foresight and that terrible mentality which looks upon a business as a system in which the return of "brass" must be immediately tangible. We consider, quite seriously, that the "brass" attitude in this country and the refusal to do worthwhile research have been the cause, in part, of the downfall of the coal and the cotton industries.

As for lack of markets in this country, there is also a good deal of nonsense in this statement. It is true that America has nearly three times our population and Germany nearly twice, but this is also an industrial country, greater even than the two already mentioned with the greatest overseas trade in the world. We should like to know how many Reed-Prentice machines, how many Isomas and how many Eckert and Zieglers have been sold here in the past three months. How many will be needed for bottle-making, if the process is a success? How many for toys, when this industry gets going properly in cellulose acetate? One very cheerful friend of our, who sells a beautiful German make of injection machine, told us he sold six during B.I.F. week. In passing, we feel sure that one of the reasons for the absence of British injection machines has been a complete lack of understanding of the importance of thermo-plastic materials as compared with the thermo-setting type.

Machine making, just as any other scientific endeavour, needs imagination to sell its goods.

Inquiries and Answers

Corrosion in Oil-tank Steamers

Thundersley.

The Editor, *Plastics*.

Dear Sir,—I thank you for your very full reply to my letter to you re protective coating for the interior of the steel tanks of steamers carrying petrol or kerosene.

For the further information of any of your readers who may be interested in this subject, there are other matters than those to which you refer which affect the internal surfaces of a vessel's tanks, such as sea water, fresh water (which may or may not contain many impurities), steam and air. These different conditions may occur in any one voyage of the ship when she is being cleaned, steamed, ballasted or when the tanks are empty for periods between ports.

With regard to the various compositions now on the market, the oil-tanker companies have carried out experiments with them, but so far without satisfactory results.

In the matter of "cost," it may well be that the use of any "protective," assuming an effective one to be found, is prohibited by reason of high cost of the product and of its application. J. S. COMMANDER.

[EDITOR'S NOTE.—The answer to this inquiry was published in our January issue. We should be glad to put those interested in touch with Captain J. S. Commander. As he previously stated, there would be in the shipping industry a tremendous outlet for a successful and economic solution of the problem.]

Plastics for the Craftsman

Dublin.

The Editor, *Plastics*.

Dear Sir,—I read with the greatest of pleasure the article entitled "Plastics for the Craftsman," in your February edition, page 53.

This article outlines exactly our position, as we are at present making up clock cases and writing sets, etc., from cast resins.

We are also making up Irish souvenirs and are most anxious to extend this souvenir range with up-to-date Irish figures.

Our difficulty is that we have only a small market, and to make figures, such as an Irish Wolfhound, etc., from steel moulds becomes quite uneconomic.

Any information that you can give us along these lines would be very much appreciated by us, as would also any information as to where we can obtain text-books or other details concerning mixtures for plastics that can be made up without heavy plant.

Perhaps you are in a position, and would be good enough, to let us have the address of Messrs. Lenart Impart, Ltd., or request them to send us particulars of Shellflex. THE ELECTRIC CLOCK CO.

[EDITOR'S NOTE.—We are unaware, of course, of the detail of design in the above figures, but, as with clock faces, the inquirer might find the solution in cast resins. Thus the outline of the wolfhound might be obtained in the form of a long rod which could be slit into a large number of flat discs of the required shape. The surface of these discs could then be cut or worked with suitable tools. Such rods of almost any cross-section can be obtained from makers of cast resin. Presumably the reader, however, knows this already.

The most important news regarding cast resins that we have heard is the fact that a liquid resin suitable for casting *by the buyer* is now available. F. A. Hughes and Co., Ltd., Abbey House, Baker Street, London, N.W.1, have been experimenting with this type for some time. Until now, as most readers know, the casting into predetermined shapes has always been done by the resin manufacturer himself. This new resin will be very attractive to the fabricator, who can make his own simple lead or other mould and who is desirous of keeping his own designs quite secret.

There is also another important announcement by the above-named firm. It is that they now have available a phenol-formaldehyde resin which can be moulded in a simple mould and which remains soft enough to shape with a carving tool. Final hardening is obtained by stoving at relatively low temperature. This might be more in line with what the inquirer wants.

As for Shellflex, we have no more information yet than that which we gave last month. We hope to get more in due course. We suggest writing to Lenart Impart, Ltd., c/o *Modern Plastics*, 122, E. 42nd Street, New York City.]

Frank Roberts, Roofing Contractor

Nelson.

The Editor, *Plastics*.

Dear Sir,—I was very interested in your Editorial and Mr. Dearle's article on plastic roofing tiles. There are several points which Mr. Dearle has overlooked; for instance, he calculates his tiles on a 16-in. by 9-in. tile—why not a 24-in. by 12-in.? With this size he would only need half his press labour and finishing labour and probably less waste. Another point is that Mr. Dearle would be able to achieve a considerable saving in freight charges. There would also be a large saving in the cost of roofing timbers. A square of plastic tiles may weigh about 200 lb., whereas a square of Welsh slates weigh about 1,000 lb.

The labour charges in laying a plastic tile would only cost about one-eighth of the cost of Welsh slates. There would be no sorting, dressing or grading, also no holing; that is, boring or punching holes in the slates for the nails.

I have no knowledge of plastic manufacturing, but I suggest asbestos fibre as a filler. Mr. Dearle gives us a diagram showing where the weight can be reduced and explains that, if the material could be reduced to half, there could be a selling figure at about £4 per square. That is a reasonable figure.

Surely it is not beyond the means of experts in the plastics industry to devise something as a cheap filler to reduce the cost? Could not sisal or asbestos fibre be used? I appreciate Mr. Dearle's article, especially his costing. It gives the layman an idea how far we have to go before we can have the plastic tile; myself, especially, who have been longing to see plastic tiles ever since I read about plastics.

I was interested to read in your Editorial notes that there was already one plastic tile patented and I would be very pleased to see one.

As you suggest in your Editorial, it is not beyond man to find some resin which could be mixed with a filler, similar to concrete, and the tiles turned out on a

concrete machine and then heated in an oven. The millions of pounds spent on roofing material should cause one to think of the possibilities there are in it.

FRANK ROBERTS
(Roofing Contractor).

Aircraft and Plastics

Cardiff.

The Editor, *Plastics*.

Dear Sir,—I have recently received some American news cuttings, which gave a report of a statement which Mr. Baekeland, Vice-president of the Bakelite Corporation, made to the Monopoly Investigation Committee at Washington on January 20. He stated that a new method had been developed whereby the fuselage and wings of an aeroplane could be constructed in one-twentieth to one-thirtieth of the time previously required. He claimed that "utilizing impregnated wood and adhesives derived from synthetic resins, the method resulted in the most perfectly calculated aerodynamic airplane ever designed." The new process supplants the part of modern aeroplane construction which takes the longest time, namely, the forming of metal wings and fuselage by riveting metal on a frame. The new method, he said, eliminated riveting.

I am aware that for some time past laminated wood, using a plastic resin as a binder and "set" under controlled pressure and heat, has been available for the manufacture of articles such as barrels, furniture, etc. We have had a project before us for some time for the manufacture of barrels by a German process utilizing laminated wood.

I should be glad if you could tell me whether or not the use of this new material for aeroplane manufacture has been investigated in this country, and whether there is any way in which we can influence a firm to take it up and manufacture it in this part of Great Britain.—Yours truly, TERENCE YOUNG,
Economic Adviser, National Industrial Development Council of Wales and Monmouthshire.

[EDITOR'S NOTE.—Baekeland's views are not only interesting but important, and since we presume they do not refer to a moulded material, are borne out by the view of Dr. de Bruyne, Director of the Aero Research Laboratories at Duxford, near Cambridge, of whom we wrote some notes in our last issue. Readers will remember that he stated in his Weybridge lecture that ". . . we can produce (from impregnated fibres) finished spars of I-section of unlimited length, but normally we produce a plank 6 ins. wide by 30 ft. long and of any required thickness." He also described a special method of utilizing these planks for aeroplane construction by the introduction of a system of interlocking dowels. Rapidity of construction is also obtained.

It is interesting to note that, on the subject of the moulded aeroplane, Dr. Bruyne says, "Some may feel disappointment at not seeing pictures of the production of complete moulded wings and fuselages. I do not think, myself, that that is the way in which development will take place in the immediate future; I believe that the contribution which plastic materials can make to aircraft construction at the present day is in the form of standard materials which can be fabricated by any aircraft manufacturer into structures of any size or shape, using only the simplest possible tools. It would be unwise to dogmatize, but it does seem difficult to visualize anyone (except, possibly, a communistic or totalitarian government) being prepared to lock up thousands of pounds of capital simply to produce one particular size and shape of wing or fuselage.

On the other hand, the inquirer will be interested to know that the moulded air-screw has been made, not from moulding powder, but from impregnated fibres. One was exhibited at the Bakelite, Ltd., Stand at the recent Exhibition in Glasgow. If he wishes to pursue the matter further, he should get into touch with concerns such as Aero Research Laboratories, Ltd., De Havilland's, and the Airscrew Co., Ltd., of Weybridge.]

Cast-resin Bases

Liverpool.

The Editor, *Plastics*.

Dear Sir,—We enclose herewith a rough suggestion which we have prepared for our own calendar pad.

You will notice that we propose using a moulded Catalin base, and we should be obliged if you could

inform us of possible sources of supply for this part of our requirements.

If you could let us have one or two names of suppliers whom you think would be able to make up the base we shall get into communication with them.

THE PALATINE ENGRAVING CO., LTD.

[EDITOR'S NOTE.—This is an excellent suggestion and the colours in which the above drawing is reproduced, orange base and green calendar, are extremely attractive. The word Catalin, however, is not a generic term for cast-phenolic resins, but is the trade name of the material made by Catalin, Ltd., Waltham Abbey, Essex.

Other cast resins, which can be supplied in any transparent or opaque colours, are Erinoplas, made by Erinoid, Ltd., Lightpill Mills, Stroud, and those made by Bakelite, Ltd., 40, Grosvenor Place, London, S.W.1, and I.C.I. (Plastics), Ltd., Buckingham Gate, London, S.W.1.

The form shown in the drawing can be cast very readily in lead moulds, but it would probably be better to produce it with the top surface of the base at a deeper angle to the horizontal to prevent trapping of air bubbles. However, this is a small point.]

(Continued on page 101.)

CHOOSING A PLASTIC

By E. E. HALLS

THE developments that have occurred in plastic materials in recent years have created a condition whereby the selection of the most appropriate plastic for the purpose in hand is not altogether a simple matter for the general user. Moreover, the problem is further complicated because basically the same material is marketed under various trade designations. Many people concerned may think that the point is not critically important, and that providing a product is produced that reasonably fulfils the obvious initial requirements, all is well. This, however, is not the soundest outlook, because it means that money is being invested in something with only a rather haphazard assessment of its value. It is logical, therefore, to ensure as far as possible that, taking into account all phases of the problem, the most appropriate choice is made.

Briefly, the main factors involved are enumerated below:—

1. Material permanence.
2. Reaction to physical conditions of service.
3. Reaction to chemical conditions of service.
4. Strength.
5. Rigidity.
6. Æsthetic appeal.
7. Forms in which available.
8. Amenability to fabrication.
9. Total cost (including that of fabrication).

A knowledge of the permanence of the material is essential, as in the first place this is a quantity that cannot be taken for granted, and in the second place it may quite well prove that a too-permanent material is not justified for combined reason of cost and service life of the article in question. Thus a transparent wrapping material would not in general require the same permanency as a transparent window material.

Information with regard to the behaviour of the material adopted under service conditions of mechanical stress, atmospheric influences with all the vagaries, combinations and fluctuations of moistness and dryness, warmth and coolness and exposure to artificial light. Where apt, reaction under electrical influences would need to be ascertained.

Chemical conditions in service enter far more generally than often realized. Dust deposition, industrial atmospheres and marine conditions are usual for consideration. The demands of chemical plant, electroplating equipment and such like are obvious. Not so apparent are the action of solvents, aqueous or spirit pastes, solutions, ointments, foodstuffs and numerous substances marketed in small containers. In the latter series, exhaustive tests to determine the behaviour of the plastic body and its suitability are essential, and it is to be noted that not only is serviceability of the plastic involved, but spoilage of the substance with which it will be in contact is also entailed. In the other cases, established laboratory tests can be utilized to simulate working conditions from which to choose the most serviceable plastic.

Strength, of course, is an obvious requirement. Impact enters into most classes of packaging, window materials, advertisement and designation signs and into all classes of goods which receive constant handling, e.g., ornaments, domestic articles and kitchen ware, and various electrical fittings and apparatus. Bursting stresses are encountered in wrapping foils, in which tensile strength is also of moment. Tensile also matters with furniture fittings, grab rails and handles. Bending moments are entailed in almost every assemblage of components, e.g., panels fixed to frames, covers fixed to bases, various housings, etc. Compression with resistance to cold flow on the one hand and rupture on the other also enter into assemblages.

The term rigidity is intended to convey something beyond the properties embraced under strength. Panellings generally must be strictly rigid; covers fitting over bases with push fit must exhibit some degree of resilience. Rubber mats need to lay flat, accommodating themselves to the surface irregularities of the flooring; rubber gaskets and washers have to exhibit resilience to accommodate joint movements and to maintain closures.

Appearance in some applications is of no consequence whatsoever; in others it may be a prime criterion of choice. Appearance may be purely a question of attractiveness for promoting sales, whereas it may be equally important, not merely in providing æsthetic appeal, but also in rendering an equipment most suitable for minimum eye fatigue and nerve strain, as well as most appropriate as a background for rendering superimposed work distinctive. Various switch and remote control panels of automatic equipments are an excellent illustration in which effort is expended towards perfection in this direction. Under the heading of appearance must also be brought transparency, translucency and opacity, colour or range of colours, mottled and speckled effects, matness or degree of gloss.

Forms in which available is a factor which becomes known to the user early in making his choice, and it determines the possible modes of fabrication. Actual panels, sheets, rods, tubes, sections, mouldings—one or more of these would have to be considered. In deciding the form, amenability of the material to machining, pressing, hot or cold forming, etc., in order to produce the particular article in question, cannot be ignored.

When a specialized piece of apparatus or equipment is being developed, performance may take precedence over cost, and the best materials for the various functions involved can be incorporated. This outlook is rarely possible in commerce, and most usually cost takes prior place. It must carefully be borne in mind, however, that cost must be interpreted as *total* cost, and not merely as mere material cost. Thus fabrication expenses with sheet or rod materials would need to be included, but especial care should be taken to see that the cost of any operations performed on moulded products are not neglected.

In the above, a broad survey of the factors which must be regarded closely prior to deciding upon a par-

ticular plastic product have been given. Either the user must make this study, or his supplier has to give the necessary advice. Whichever course is followed, having determined the requirements of the article, the characteristics of the plastics available can then be examined to see how far any one plastic can satisfy the conditions, or what compromise can be effected. The field of plastics is large, and the various combinations of service conditions render the study of selection unlimited, and consequently it cannot be treated in the space of an article of this type. In the following, however, are very briefly expressed the salient features of the more popular plastic materials in use.

Rubber Products

From pure rubber, through various stages of vulcanization, and inclusion of inorganic loadings, raw material ranging from soft, pliable and highly compressible to hard and rigid is practicable. These materials are characterized by non-absorptive, waterproof and chemical resisting properties, and are in front rank for electric strength. They are amenable to fabrication, available in most of the recognized forms, and favourable for cost. There is some limitation to material permanence, to temperature, to resistance to flow under pressure, reaction to light and to range of colours or artistic effects. Synthetic ingredients can be included to improve resistance to oils and to heat.

Phenol-formaldehyde Products

The phenol-aldehyde resin plastics cover a wide number of forms, and their versatility has established them in practically every branch of industry. Articles can be fabricated from a number of distinct varieties of sheet, rod, tube and section, or pressed from sheet, or moulded from one of a number of powders. From a broad point of view, these products are "permanent," with very little restriction under the physical conditions, electrical excepted, of service, and demanding special consideration with respect to chemical resistance only when purely chemical conditions obtain. Electrically, they satisfy normal insulation and electric strength requirements, although they are inferior to the rubber group; in high frequency fields, practically none so far developed are fully satisfactory. Resistance to heat is good, being satisfactory up to 130 degrees C., and higher with special grades. Reasonable mechanical strength is possessed, and special varieties can be obtained for the more severe instances. They are rigid, but here, again, special varieties cater for specific applications. The only restriction with respect to appearance relates to colour, which in the light pastel shades is not permanent. All are amenable to the normal methods of fabrication, providing the latter are adjusted to suit the media involved, and their cost, in the plastic series, is only improved upon by certain members of the rubber series.

Cellulose Acetate Products

Material in the form of sheet, rod, tube, film, sleeving and moulding powders is available at acceptable cost, although dearer than the rubbers and phenol resins. The only serious limiting factor under the heading of physical conditions of service is an upper temperature restriction of 60 degrees C. Some dimensional changes occur with fluctuating humidities or temperatures, and an ultimate shrinkage generally results. This is only of importance in a small percentage of applications, especially where panels, windows and thin sheet labels or dials are involved. Electrically, the acetates are very good except under H.F. conditions. Chemically, they are generally satisfactory, the most definite restriction in this sense being towards a wide range of solvents. Strength is good, especially under impact. They are more flexible than the Bakelite group, and are not so hard. Exceedingly attractive appearances can be secured, permanent colours in all shades or mottles, opaque, translucent or transparent being possible. Regarding fabrication processes, rather more care is required in blanking than is demanded by "bakelites," although machining is easier. They can be hot formed, followed by cooling off in the jig to shape. Moulding from powder is possible by the injection process, which, for the right type of moulding, on account of its rapidity, is cheaper than pressure moulding.

Amino Plastics

Powder for moulding is the chief form of the several amino plastics, but a restricted use is made of sheet and rod in moulded or laminated types. In a relative sense they are rigid and "permanent," but suffer more restrictions in general service than the "phenol" type. Maximum exposure temperature should be 90 degrees C. Moisture absorption is greater, expansion under humid conditions and shrinkage under heat or dry conditions are much greater. On the other hand, colours are fast to light, these even applying to pastel shades. Again, they possess the specific quality of resistance to electrical tracking, which is not exhibited by phenolics, although in other electrical properties they offer no superiority. Chemically, they are inert in the general sense, but in purely chemical applications detailed consideration of behaviour would have to be made. Mechanically, the amino products are slightly inferior to the Bakelite materials, but within the compass of their utility they are satisfactory. Æsthetic appeal is perhaps the prime and unrivalled attribute of the amino series, and it is noteworthy that they are used to veneer the Bakelite laminated sheets when surface appearance and colour are of paramount importance. The amino plastic products can be machined and, of course, moulding from powders is an established procedure; in other senses they do not lend themselves readily to manipulation. Cost is of similar order to that of the phenolics, and, where they apply, the two specific merits of non-tracking and æsthetic appeal have to be taken into account.

Methyl Methacrylates

Although not so highly developed in this country as in America, the methyl methacrylates are obtainable in sheet, rod and tube forms, and in moulding powders. They are comparable with cellulose acetates, with the following differences: Cost is appreciably higher. Physically, they possess a lower water absorption value, negligible dimensional change with fluctuations in humidity, but the same temperature restriction. Clarity is superior, crystal clearness of the water-white variety being exceptional. Mechanically, they are somewhat inferior to acetate.

Styrols

America and the Continent are the chief initiators of these products—sheet, foil, moulding powders. Again comparing them with acetates, they show advantages in stability of dimensions in service; the same limitation is imposed with respect to heat, but they are virtually non-absorptive and permanent in

dimensions under wet and dry conditions. Their outstanding characteristic is low loss in H.F. electric circuits. They are much more expensive than the acetates, mechanically inferior to them, and not equal to methacrylates for clarity.

Polyvinyls

These are represented by the polyvinyl chlorides or mixed vinyl chloride/acetate polymers, available as sheets, tubes, sleevings, etc. They range from hard, rigid types to pliable rubber-like products. Compared with acetate, they are expensive, the temperature restriction obtains, but stability under fluctuating wet and dry conditions is superior. Chiefly of interest from the electrical industry are the tubes, sleevings and cable tapes, and, from general industry, the coloured sheets for panellings.

Wrapping Foils

These are inserted under a separate heading, because, of the foregoing, the only material suitable, for expense or other reasons, is cellulose-acetate film, while, again, other materials, viz., "Cellophane," moisture-proof "Cellophane," and Pliofilm, by virtue of the bulk of their application being for wrappings, need only consideration in this one field. The importance of hygiene and preservation in the domain of packaging has naturally brought plastics to the front for consideration. At one time cellulose acetate was the only plastic contender, but the innovation of moisture-proofed "Cellophane," which, by virtue of a surface coating, not only overcame the previous disadvantages of "Cellophane" itself, but from the moisture-proofing viewpoint showed great advantage over acetate, changed the position. Later, the American development of rubber hydrochloride films gave, in that country, a valuable competitor to "Cellophane." These materials are obtainable in a range of colours and thicknesses, and sheet forms, rolls, tapes, etc. In this country moisture-proof "Cellophane" forms the bulk of the usage and is specially adapted for automatic machine packing methods and sealings.

A critical survey has not been attempted in the above, but the object has been to indicate the outstanding characteristics of the accepted plastic materials. It is felt that the user should be in position to associate with a particular plastic type a range of characteristic properties in the same way that an engineer visualizes those of various metals. Furthermore, in choosing the plastic, he should be in a position rapidly to assess whether the advantages of one material over another are worth while.

Inquiries and Answers

(Contd. from page 98).

Twickenham.

The Editor, *Plastics*.

Dear Sir,—We were very interested to read your article "Plastics and 'These Foolish Things,'" in your January issue, particularly so as we have recently had an inquiry for rubber made up in sheet form that can be made to be luminous in the dark.

We are wondering whether you have had any experience with this type of material, and also whether the fluorescent chemical, to which you refer, can be satisfactorily adapted to indiarubber sheeting in vulcanized form.

Further, is this fluorescent chemical permanent when applied to any surface, and how would it react in open-air conditions?

Any assistance you are able to give us in this matter would be highly appreciated, and we wish to take this opportunity of expressing our admiration for your journal. THE POPPE RUBBER AND TYRE CO.

[EDITOR'S NOTE.—There are two methods of making materials luminous in the dark; first, by impregnating with a solution of fluorescent chemicals, which give forth light in the dark under the action of ultra-violet light, and, secondly, by the application of what is virtually a paint which is luminous in the dark without any secondary aid.

The first type, which was used in "These Foolish Things" on cellulose acetate, includes a number of water—or alcohol—soluble dyes and intermediates for dyes, such as certain Rhodamines, Fluoresceine NS, Methyl Violet, Methylene Blue and Green, H Acid, J Acid, Cleve Acid, etc.

In view of their nature it would seem unlikely that the above could be incorporated in rubber; nor is it probable that they would withstand a vulcanizing process. However, more reliable information might be obtained from such concerns as Imperial Chemical Industries, Ltd. (Dyestuffs Section), Millbank, London; or Williams (Hounslow), Ltd., Hounslow.

The only feasible method would appear to be to apply a luminous paint, the active ingredient of which is generally barium sulphide, and which, after exposure to ordinary daylight, is luminous in the dark for considerable periods. In some instances periods of 100 hours has been claimed. The paint would normally be applied on the surface of the rubber. Although the analogy is not close, the reader may remember that in our October, 1937, issue we described a new type of cellulose acetate, in which barium sulphide, or some similar chemical, had been incorporated to produce a luminous plastic with great success. This process might be possible with rubber, since the barium sulphide, being inorganic, would probably withstand a vulcanizing temperature. As for resistance to air-conditions, there is little doubt that London air, for example, would have a bad effect. The deposition of moisture, soot and other dirt would certainly be deleterious to barium sulphide.]

Plastic Washers

Birmingham.

The Editor, *Plastics*.

Dear Sir,—We enclose herewith a sample washer which came to us from America. It looks as though it is made of some plastic material, although of this we are not certain. Do you know of any maker of a similar washer in this country? Please return sample.

GASKELL AND CHAMBERS, LTD.

[EDITOR'S NOTE.—We cannot tell of what plastic the washer is made without destroying it, but it certainly appears to be a plastic, and it is so pliable that we suspect it to be of celluloid or cellulose acetate. We do not know of any manufacturer here making such a washer as a standard product, but the inquirer should apply to British Xylonite Co., or other manufacturers of sheet celluloid or acetate. Similar washers, although not so pliable, could be made from laminated sheet.]

TRADE AND PERSONAL NOTES

Alfred Herbert, Ltd., Coventry, have forwarded us some interesting particulars regarding "Durexite," a product of Durex Abrasives, Ltd., which is an abrasive cloth specially suited for grinding and finishing operations of all metal parts. For the convenience of operators and to ensure a maximum of economy in use, "Durexite" cloth is supplied in Economy Rolls containing 50 yards of material with special side flanges, as illustrated. "Durexite" cloth Economy Rolls are available in a wide range of grit numbers, from No. 320 (very fine) to No. 24 (very coarse), and in widths of ½ in., ¾ in., 1 in., 1½ ins. and 2 ins., thus providing a grit and width for every requirement. Suspended over the workbench, "Durexite" cloth Economy Rolls are ready for immediate use, the operators cutting off a length of the most suitable width and grit when the need arises.

Rheostatic Co., Ltd., Farnham Road, Slough, suffered considerable damage to their Slough factory when a fire broke out early on the morning of February 4. Fortunately the flames were confined to the assembly department, but a large number of electrical instruments and stock was destroyed, including the company's exhibits for the British Industries Fair. The damage has been estimated at nearly £50,000.

The Hercules Powder Co., Wilmington, Delaware, have sent us a copy of their new brochure entitled "Hercules Chemist." This describes the properties of hydrogenated rosin known as "Staybelite." This is the first highly saturated hydrogenated rosin to be produced on a commercial scale. It represents a distinct contribution by Hercules research chemists and is covered by American patents. The new product will soon be available in Europe.

Dr. P. Stocklin read a paper on "Buna Rubber" at the London and District Section of the Institute of the Rubber Industry on February 13, at the Northumberland Rooms, Northumberland Avenue, W.C.2. Mr. T. R. Dawson was in the chair.

Plastilume Products, Ltd., have informed us that the address of their factory and offices is now Station Works, High Wycombe, Bucks. Phone number, High Wycombe 1610-1.

George R. Eyssen informs us that he is now associated with The Process Development Laboratory, Ltd., consultants to the plastics industry. The address of the company is 23, Tyneham Road, Lavender Hill, S.W.11.

The Ray Engineering Co., Ltd., Waterdale Works, Southmead, Bristol, announce that their luminous moulding powder, Grade 1014, is now available ready for use. It is specially suitable for the moulding of special electrical equipment and for indication buttons, figures, letters, etc.

E. K. Cole, Ltd., Southend-on-Sea, have constructed some of the finest air-raid shelters in the country for the benefit of their employees. In a statement which Mr. W. Jones, director and works manager, has just sent us a plea is made that industrial A.R.P. knowledge should be pooled and manufacturers well advanced with shelter construction and evacuation plans should pass on the benefit of their experience for the good of the industrial community as a whole. E. K. Cole, Ltd., offer to all industrial executives full constructional details and plans of the shelters they have built for 3,000 employees, together with information on evacuation routine and training. In time of emergency the continuance of industrial production, more than ever essential, can be assured only by the existence of proper and adequate protection for those employed in the factories. It has already been stated that the responsibility for providing this protection rests upon manufacturers, many of whom have already advanced their plans and constructional work to an almost complete stage. The money and time spent on these initial preparations, it is suggested, are being duplicated over and over again in all parts of the country, placing on British industry a financial burden as ill-timed as it is unnecessary. The pooling of information on industrial A.R.P. would lighten it immeasurably.

Senior Economisers, Ltd., have forwarded us a copy of their new publication dealing with the Senior H-tube economizers. The uses and advantages of this equipment are set forth and there are drawings and photographs of various types and typical installations.

Crofts (Engineers), Ltd., are now issuing to interested parties a new booklet (SG.138) describing their Crofts Stock V-rope drives. The catalogue, which is fully illustrated, runs to 148 pages.

The Incandescent Group, comprising four specialist companies, the Incandescent Heat Co., Ltd., the Selas Gas and Engineering Co., Ltd., Controlled Heat and Air, Ltd., and Metalectric Furnaces, Ltd., have forwarded us a well-illustrated brochure depicting their various activities. Frequent exchange of statistics and experimental data enables this group of specialist companies to give expert advice and supply the best equipment for any industrial heating operation. The customer may, therefore, put forward his problems with the knowledge that the entire incandescent organization is at his disposal to assist in the selection of the most suitable plant for his requirements. The Incandescent Group is showing at the B.I.F., Castle Bromwich, Stand No. Cb6050504.

Automatic Weighing and Packing Machine Co. have just published a new brochure illustrating some typical installations of precision weighing and filling instruments for industrial and other applications.

Bakelite, Ltd., have forwarded us a copy of "Bakelite Progress" for February, which, as usual, contains a number of items of interest both to the trade and the numerous industries now using their products.

National Institute of Industrial Psychology, Aldwych House, London, W.C.2, have sent us No. 1, Vol. XIII, of their excellent journal dealing with occupational psychology. The journal contains an important article by Dr. H. M. Vernon entitled "To What Extent is the Health of the Industrial Worker Dependent on Occupation?"

Changes in Cellulose Wrapping Import and Export Trade

Until a year ago the United Kingdom was an importer rather than an exporter of transparent cellulose wrapping (e.g., "Cellophane"). During 1938 exports exceeded imports by approximately 14,000 cwt., largely as a result of the operations of British Cellophane, Ltd., in their new factory at Bridgwater, Somerset, and extensions at other factories. Details of the export trade in the past two years are as follow:—

	1938 cwt.	1937 cwt.
Total	17,965	14,498
of which to:—		
Australia ...	4,809	4,949
South Africa ...	3,131	1,970
Eire	2,666	1,378
India	1,342	1,923
Denmark ...	1,131	716
Canada	1,049	581
New Zealand ...	827	1,092

The only one of the above countries with a home manufacture is Canada, but plans are in hand for production in Australia.

Imports, which in the early part of 1938 were on a reduced level, are now almost negligible. This reveals a very satisfying change.

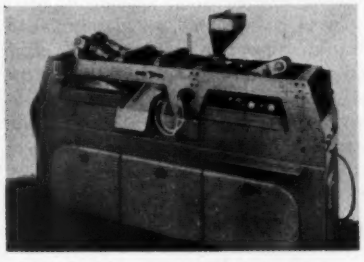
NEW MATERIALS—NEW PLANT—NEW METHODS

New Moulding Machines at Leipzig Fair

At the technical section of the Leipzig Fair, which is open until March 13, a number of new moulding machines will be shown, and considerable emphasis is to be laid by exhibitors on fully automatic injection-moulding machines owing to the importance now being attached to these on the Continent.

The two well-known German engineering firms Franz Braun of Zerbst and Eckert and Ziegler of Braunsfelde, nr. Cologne, are exhibiting. The first-named firm are showing the Isoma-Automat and the latter the EK/IV Automat. Both machines will be demonstrated.

In the case of the EK/IV Automat made by Eckert and Ziegler, all working processes, namely, the closing of the die and the ejection of the finished parts, are performed in uniform succession by one single electric motor. The driving power is transmitted by a rubber V-belt to the machinery, which, in the first place, closes the die and then presses the casting batch into the die. The total reaction pressure of the moulding piston created by this operation depends for support on the die-closing levers. As the result of the ratio of transmission chosen by the designer, the die-closing pressure always amounts to many times the pressure required for moulding. The moulding cylinder of the EK/IV is also heated electrically, use being made of an outside heating radiator as well as of an inside heating element. The machine is controlled by a change-over switch and a press-button box. It admits of manual operation, semi-automatic and all-automatic operation.

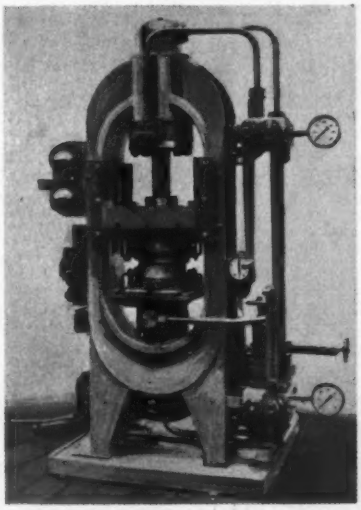


The EK/IV Automat made by Eckert and Zeigler.

The Isoma Automat is driven by two electric motors, of which the one carries out the opening and closing movements of the die, while the other moves the piston of the heating cylinder forward and thereby presses the material into the heating cylinder and thence into the die itself. The casting material is pressed into the steel die, after it has been closed by the closing motor, with a pressure of approximately 1,000 kg. per sq. centimetre. This creates a pressure within the die of 50 tons and more, and to prevent the die from bursting open a double toggle-lever mechanism is brought under force, which ensures a perfectly reliable closure of the die. The heating cylinder of the Isoma transmits the required heat to the casting material from outside and inside. It is equipped with an automatic, easily adjustable contact pyrometer, which maintains the temperature once set accurately at the required level and prevents any burning of the material.

Series presses of up-to-date construction will be exhibited for the first time at the technical section of the 1939 Fair. Messrs. Krause of Altona-Hamburg; Siempelkamp and Co., and Becker and Van Huellen are the most important. It is realized that, in spite of continual research and experiment designed to reduce moulding time, there has not so far been any marked reduction in curing time or any increase in production. Series presses will, it is claimed, speed up production. By means of press-buttons the operator can control the opening of the presses and exploit to the full the increased capacity of the machines.

The advantages of injection moulding are now well known, and it is, therefore, of interest to note that great efforts are being made to mould by injection thermo-setting as well as thermo-plastic materials. A new machine will be exhibited at the Fair which, it is stated, represents the greatest advance made so far in this direction. The machine operates with top piston and bottom piston and has a charging hooper adjoining the die. The batch is pressed from this charging chamber through heating nozzles into the die, where forming and hardening take place under the influence of the pressure applied by top and bottom pistons.



The new type of injection moulding machine for thermo-setting materials made by Krause.

The machine is made at the engineering works of Krause of Altona-Hamburg.

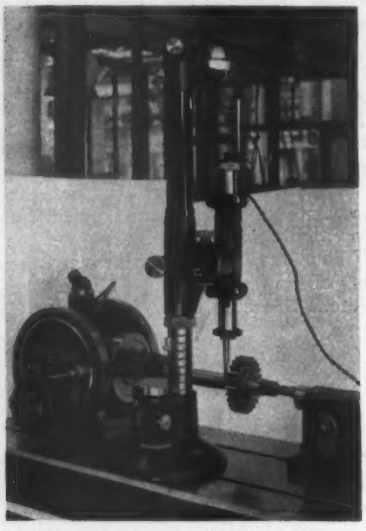
Controlling the Accuracy of Laminated Gearwheels

In the machining of gearwheels from metal and also laminated boards it is important that a high degree of accuracy should be ensured. To standardize accurate dimensions and to check involute curves of gear teeth, various scientific instruments are available. The function of inspection equipment is primarily to ensure that the desired accuracy of the product is consistently maintained, and all measuring instruments must be capable of giving results of the highest order of accuracy. All these characteristics are combined in the Zeiss range of measuring instruments. The readings are extremely accurate and, due to the optical systems of measurement, results are not affected by wear. Each instrument has a wide range of application. This flexibility is increased by the fact that two instruments can often be used in combination to solve many difficult measuring problems.

The Zeiss Optical Dividing Head and Vertical Comparator have been developed for checking the involute curve of gear teeth. Unlike the ordinary dividing head, the Zeiss Optical Dividing Head does not depend for its accuracy on mechanical means of division. Due to the optical system involved, readings are unaffected by wear in the component parts of the head, and original accuracy, which is of an extremely high order, is maintained throughout its life. The head provides an absolute standard of reference for angular movement, a means of checking and measuring, a dividing engine and a self-contained tool which can be used in production on toolroom work, such as milling, boring and grinding. The construction of the head is such that

it is perfectly rigid under the heaviest cuts and under workshop conditions will handle work outside the capacity of an ordinary head.

The instrument is entirely unaffected by wear and will retain its original accuracy indefinitely. Measurements are made very quickly without preliminary setting, other than adjusting the instrument to read zero when the



Close-up view of the new Zeiss apparatus for measuring involute curve.

contact tip is resting on the table. When using the Dividing Head and Vertical Comparator for checking the involute curve of gear teeth the results are not only extremely accurate, but are obtained in a short space of time.

In many workshops the checking of involute curves is necessary only at infrequent intervals and the cost of installing the equipment for this purpose may appear uneconomical. This is not so. As each of the instruments mentioned above has its own wide field of application, it can be used for other work when not being used in combination and may thus be kept fully occupied.

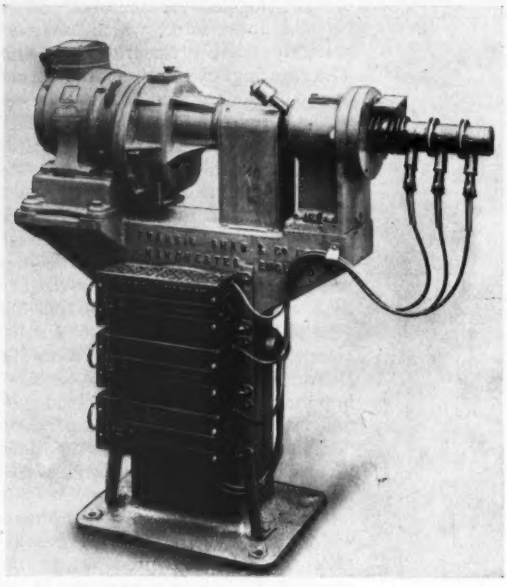
(Abstracted from the *Machine-Tool Review*, December, 1938.)

Mipolam Extruding Machine

Francis Shaw and Co., Ltd., Cobbett Street, Manchester, 11, have developed a machine for extruding Mipolam. This material has very similar properties to rubber, but requires a higher temperature for extrusion purposes. The heat has to be built up gradually from the feed hopper to the die, and for this reason electric heating has been adopted, as it is extremely difficult to get satisfactory steam pockets in such small machines and to retain a varying temperature. Each heating element is provided with a thermometer and is controlled by a thermostat placed in a convenient position on the stand of the machine.

To obtain a rapid transfer of heat from the elements to the material, the cylinder of the machine has to be kept as thin as possible, and is made of hardened steel. The scroll is carefully developed and highly polished, being made from hardened nitralloy steel. At the end of the scroll a device is fitted in the cylinder just prior to the die, which forces the Mipolam against the hot cylinder walls in order to get it as plastic as possible before it meets the die.

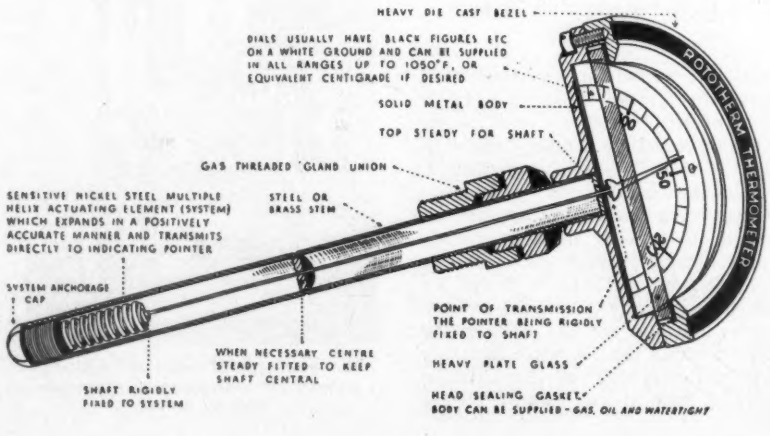
The machine is driven by a 2 h.p. geared motor and is capable of extruding tubes up to $\frac{1}{2}$-in. bore with a $\frac{1}{16}$-in. wall. They also make a machine with a 2-in. diameter scroll, which is driven by a 5 h.p. motor and is suitable for tubes up to 1-in. bore with $\frac{1}{8}$-in. wall. The machines can be fitted with dies for rods and tubes, or for wire coverings, and they should increase the scope of plastics in the electrical industries.



The Francis Shaw extruding machine for Mipolam is sturdily designed for long and continuous service.

Rototherms in the Plastics Industry

The new catalogue of The British Rototherm Co., Ltd., Station Road, Merton Abbey, S.W.19, describes very fully the many different instruments in use throughout industry. Besides possessing outstanding advantages in the matter of sustained accuracy and readability, the Rototherm temperature gauge scores heavily in the all-important matter of economy. The element comprises no capillary tube to become damaged, no column of mercury to give trouble, no glass phial to break. Vibration, normal mechanical shock and reasonable excess temperatures, leave the Rototherm with its accuracy unimpaired, and the element cannot be affected by fatigue. Finally, it should be noted that the reading of the instrument is not affected by expansion and contraction of the stem.


HEAVY DIE CAST BEZEL
DIALS USUALLY HAVE BLACK FIGURES ETC ON A WHITE GROUND AND CAN BE SUPPLIED IN ALL RANGES UP TO 1050°F, OR EQUIVALENT CENTIGRADE IF DESIRED
SOLID METAL BODY
TOP STEADY FOR SHAFT
GAS THREADED GLAND UNION
STEEL OR BRASS STEM
SENSITIVE NICKEL STEEL MULTIPLE HELIX ACTUATING ELEMENT (SYSTEM) WHICH EXPANDS IN A POSITIVELY ACCURATE MANNER AND TRANSMITS DIRECTLY TO INDICATING POINTER
SYSTEM ANCHORAGE CAP
WHEN NECESSARY CENTRE STEADY FITTED TO KEEP SHAFT CENTRAL
SHAFT RIGIDLY FIXED TO SYSTEM
POINT OF TRANSMISSION THE POINTER BEING RIGIDLY FIXED TO SHAFT
HEAVY PLATE GLASS
HEAD SEALING GASKET BODY CAN BE SUPPLIED - GAS, OIL AND WATERTIGHT
ROTOTHERM THERMOMETER

Closures manufactured in opaque and translucent colours from all types of Powders and Injection Mouldings, can be supplied from stock Moulds or to suit Customers' requirements.

U.G.B
CREATIONS
Radiate Charm

THE PERFECT PAIR • BOTTLE AND CLOSURE

MANUFACTURED BY

UNITED GLASS BOTTLE MANUFACTURERS LTD

The Largest Manufacturers of Glass Bottles in Europe.

8, Leicester St., London, W.C.2. *Telephone: Gerrard 8611 (10 lines). Telegrams: "Unglaboman, Lesquare, London."*

Other Temple Press Publications

Journals

"THE MOTOR." The National Motor Journal. Every Tuesday, **4d.**

"THE LIGHT CAR." The Specialised Journal for Light-car Owners. Every Friday, **3d.**

"THE COMMERCIAL MOTOR." The Leading Journal dealing with Road Transport. Every Friday, **3d.**

"MOTOR CYCLING." The Original Motor Cycling Journal. Every Wednesday, **3d.**

"CYCLING." The Leading Cycling Journal of the World. Founded 1891. Every Wednesday, **2d.**

"THE AEROPLANE." The Leading Aviation Journal of the World. Every Thursday, **6d.**

"THE MOTOR BOAT AND YACHTING." For all interested in large and small Pleasure Motor Craft, Sailing Craft with Auxiliary Engines, and Commercial Motor Vessels for Coastal Services and Inland Waterways. Every Friday, **4d.**

"THE MOTOR SHIP." The Only European Journal Dealing Exclusively with Oil-engined Vessels. First of Each Month, **1/-.**

"THE OIL ENGINE." Deals with Compression-Ignition Engines for All Purposes other than Marine Propulsion. 15th of Each Month, **1/-.**

"LIGHT METALS." Deals comprehensively with the Production, Treatment and Uses of Light Metals and their Alloys. Monthly, **1/-.**

Manuals

"PETROL & OIL ENGINES." 2/6 net; 2/9 post free.

"OIL ENGINES for Road, Rail and Air Transport." 5/- net; 5/6 post free.

"MOTOR BOAT MANUAL." 5/- net; 5/5 post free.

"THE MOTOR MANUAL." 2/6 net; 2/10 post free.

"MOTOR SHIP REFERENCE BOOK." 5/- net; 5/6 post free.

"HOW TO DRIVE A CAR." 2/6 net; 2/9 post free.

"MOTOR REPAIR MANUAL." 2/6 net; 2/9 post free.

"MOTOR CYCLING MANUAL." 2/- net; 2/3 post free.

"THE AEROPLANE" DIRECTORY OF THE AVIATION AND ALLIED INDUSTRIES. 10/6 net, post free.

"POWER & SPEED." 8/6 net; 9/- post free (abroad, 9/6).

Proprietors, Printers and Publishers:
TEMPLE PRESS LTD., 5-17, ROSEBERY AVENUE, LONDON, E.C.1.

"OUR WORKERS PROTECTED AGAINST DERMATITIS"

STATEMENT BY MANUFACTURER

A leading Aeroplane Company states: '*ROZALEX is particularly useful for sealing the pores and preventing the ingress of dirt and germs where, as in our Engineering Shops, the hands and arms are exposed to infection.*'

Rozalex is indispensable for all types of work where the workpeople's hands are likely to suffer from Dermatitis, or other allied diseases, through contact with injurious materials, dirt, etc. It is a protective film or 'barrier substance' for application to the hands *before work*, and makes washing after work easy. Rozalex has been proved over a period of nine years.

Patent No. 368496

The Chromium-plated Rex Dispenser, specially designed for issuing Rozalex easily and economically in factories.

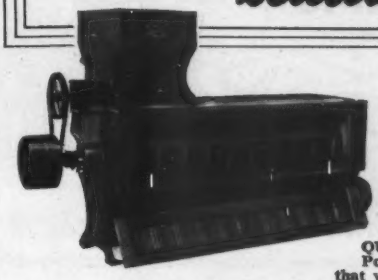
ROZALEX

The PROVED protective 'film' for application to the hands *before work.*

For FREE SAMPLES and particulars write to:

ROZALEX LTD., Yorkshire House, Cross Street, Manchester, 2

The colour-question settled



It's so easy to change the screens and to clean the interior of a Gardner patent QUICK-CHANGE Powder Dresser that you could dress powders in all colours of the rainbow in the course of an average working day.

There's not the least danger of any powder being contaminated by its predecessor, either tonally or chemically.

You could learn all about it if you'd write to WM. GARDNER & SONS (GLOUCESTER) LTD., Bristol Road, Gloucester.

Telephone: 2288. Telegrams: "Gardner, Gloucester."

London:
19, Gray's Inn Chambers, 20, High Holborn, W.C.1.
Telephone: Chancery 7347.

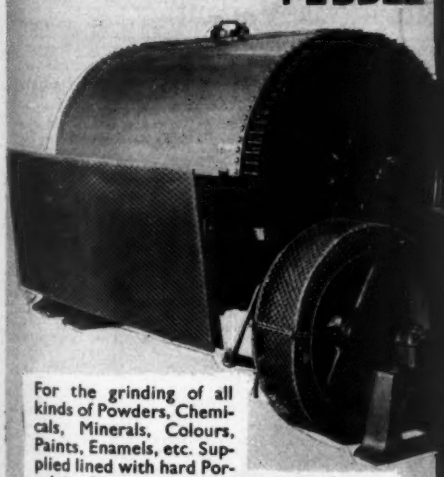
Gardner's

PATENT "QUICK CHANGE"

FINE POWDER DRESSER

STEEL-SHAW

PEBBLE MILLS



For the grinding of all kinds of Powders, Chemicals, Minerals, Colours, Paints, Enamels, etc. Supplied lined with hard Porcelain, Silex, or special linings, and can be insulated to suit particular classes of work.

Send for our free illustrated literature.

STEELE & COWLISHAW, *Engineers,*
COOPER ST., HANLEY, STOKE-ON-TRENT
London Office: 329, High Holborn, W.C.1.

Nearly a Century's Experience in Grinding

High Quality mouldings

Moulders to the General Post Office, Admiralty, Air Ministry and other Government Departments.

Ebonestos have produced many of the finest mouldings manufactured in compositions, Bakelite, Urea, Diakon, and other synthetic resins. For the past 40 years, our reputation for finish and accuracy has been second to none. Let us know your moulding requirements, and we shall be pleased to send one of our technical experts to discuss the matter with you, or, if you prefer it, meet you at our factory.

EBONESTOS

INDUSTRIES LIMITED

EXCELSIOR WORKS, ROLLINS ST., LONDON, S.E.15

Tel.: New Cross 1913 (6 lines)

HEADS FOR RAMS

to the specific requirements of our customers.

Makers of all types of repetition products from the bar in all metals.

M·C·L AND REPETITION LTD. POOL LANE LANGLEY BIRMINGHAM

BYSON

FOR BAKELITE

Acetate and other synthetic mouldings. Modern plant and facilities.

Coal is Dearer! but Steam is Cheaper

IF YOU INSTAL A

SUPER-ECONOMIC BOILER

PATENT Nos 429383 · 475031

WRITE FOR PARTICULARS

DANKS of NETHERTON, LTD.

NETHERTON · DUDLEY · WORCS.

BOILER MAKERS FOR A CENTURY

ULTRA MODERN DAYLIGHT FACTORIES

SHEPHERD'S BUSH

Sq. 5,500—30,000 ft.

Close to Tube. Modern, newly-erected ground-floor FACTORIES with excellent first-floor office suites. Good loading facilities. All services, including central heating

TO BE LET OR SOLD

Full particulars from

HILLIER, PARKER, MAY & ROWDEN

27, Maddox Street, W.1. **Telephone: Mayfair 7666**

CASEIN MATERIAL
IMITATION HORN, SHELL, ETC.
PLAIN & FANCY COLOURS 'Phone: Stonehouse, Glos., 243.
RODS, SHEETS, TUBES, BLANKS

YOUNG & WOLFE BRIDGEND WORKS, STONEHOUSE, Glos.

GNH

G. N. HIGGS

Consulting Industrial and Research Engineer to the PLASTIC and Allied Trades.

93, The Avenue, London, W.13. PERivale 5404.

Machinery for Sale

TWO NO. 3 MANESTY PREFORMING MACHINES for sale. Can be seen working by appointment. Box 1795, c/o "PLASTICS," 5-17, Rosebery Avenue, E.C.1. 22/24

Businesses for Sale

FOR SALE AS A GOING CONCERN. The goodwill and assets of Plastic Fabricators Ltd., Edmonton, manufacturers of buttons, buckles, etc. For particulars apply to H. M. Thring, A.L.A.A., Receiver and Manager, 18, Essex Street, Strand, London, W.C.2. 22/25

Situations Vacant

WANTED—CHEMIST EXPERIENCED SYNTHETIC RESINS, CRESOL, PHENOL AND MODIFIED. Preferably with Plastic experience. Capable supervising manufacture. Small firm London district. State age, experience, references, salary required. Possibility acquiring share. Box No. 2023, c/o "PLASTICS," 5-17, Rosebery Avenue, E.C.1. 22/26

EXPERIENCED BAKELITE MOULDERS REQUIRED by Company situated in West London. Details of experience to Box No. 2024, c/o "PLASTICS," 5-17, Rosebery Avenue, E.C.1. 22/27

— NOTICES —

ADVERTISEMENTS

ALL instructions, matter and passed proofs for all kinds of advertisements must reach the Head Office of "PLASTICS" by the 24th of each month to ensure insertion in the following month's issue.

Whilst every precaution is taken to ensure accurate printing, the publishers will not be responsible for printers' errors, or for errors arising out of telephonic instructions relating to advertisement copy; nor will they be responsible for advertisement blocks destroyed by fire or that are left in their possession for more than one year.

REGULATIONS.—Copy must be supplied without application from the publishers, and current copy and blocks will be repeated if new copy is not received at the time for closing for press. Orders for advertisements are subject to acceptance in writing from the Head Offices. Advertisement copy is subject to the approval of the publishers. All advertisements and contracts are accepted and made upon the express condition that the publishers have the absolute right to refuse to insert copy to which they may object for legal, public or trade reasons, which includes the right of rejection of advertisements, whole or part, containing cut prices of goods coming under an approved price maintenance scheme, and such refusal of copy shall not be a good ground for advertisers to stop a current contract or to refuse to pay for the same, or for taking action for breach of contract. The Proprietors, whilst endeavouring to ensure that advertisements shall appear with all possible regularity, will not be held liable for any loss occasioned by the failure of any advertisement to appear from any cause whatever. The acceptance of an order does not confer the right to renew upon similar terms. Contracts relate to the advertiser's own goods or services, and the space may not be sub-let or disposed of in any way. Conditions which are contained in order forms other than those of the Proprietors, and which do not conform to, or are in addition to, the Proprietors' conditions, will not be recognized as binding. Special conditions must be subject to mutual agreement.

REMITTANCES.—Postal orders, cheques, etc., should be made payable to Temple Press Ltd., and crossed "Midland Bank, Ltd., Bedford Row." Remittances from abroad should be made by International Money Order in Sterling.

TERMS.—Monthly accounts, strictly net; due when rendered.

EDITORIAL

All Editorial communications and copy should be addressed to the Editor, and must reach him not later than the 24th of the month for the next issue. MSS. or drawings which are not considered suitable will be returned if stamps are enclosed, but the Editor does not hold himself responsible for the safe keeping or the safe return of anything submitted for his consideration.

Accounts for contributions should be sent in immediately after publication, addressed to the Manager. Payment will be made during the month following publication. All articles, drawings and other contributions paid for and published in this journal are the copyright of the publishers from whom alone authority to republish or reproduce can be obtained.

Other Business Notices appear in the front of the book.

TEMPLE PRESS LIMITED,
5-17, Rosebery Avenue, London, E.C.1
Proprietors, Printers and Publishers of "Plastics," "The Aeroplane," "The Oil Engine," "The Motor Ship," "The Motor Boat and Yachting," "The Motor," "The Commercial Motor," "The Light Car," "Light Metals," "Motor Cycling" and "Cycling."

ERINOID
FAMOUS PRODUCTS ARE
ERINOID
THE LEADING CASEIN MATERIAL
ERINOPOL
THE LEADING LIQUID POLISH FOR ARTIFICIAL HORN
ERINOL
SYRUP FOR WATERPROOFING, PAPER COATING, INSULATING ETC.
ERINITE
SYNTHETIC RESIN FOR VENEER STOVING VARNISH, ETC.
ERINOFORT
NON-FLAM CELLULOID IN SHEETS, RODS AND TUBES, ALSO CUBES AND POWDER FOR INJECTION AND CUBES AND POWDER FOR OTHER MOULDING PROCESSES
ERINOID LTD
Lightpill Mills
STROUD
GLOS.

MARCH, 1939. Vol. III. No. 22.

Plastics

ONE SHILLING

RM

SERVICE and DEPENDABILITY

Mouldings of PRECISION & UTILITY

ROOTES MOULDINGS LTD are in a position to handle any moulding problem, simple or complex, and will prepare you with the most economical and satisfactory solution.

MOULDINGS OF BAKELITE AND OTHER SYNTHETIC MATERIALS

A.I.D. APPROVED

ROOTES Mouldings Ltd

SLOUGH . . . . BUCKS

Telephone . . . . . Slough 491

Printed in England and Published Monthly by the Proprietors, TEMPLE PRESS LTD., 5, 7, 9, 11, 13, 15, 17, ROSEBERY AVENUE, LONDON, E.C.1

AGENTS ABROAD—FRANCE—W. H. Smith & Son, 248 Rue de Rivoli, Paris. Messageries Dawson (S.A.), 4, Rue du Faubourg Poissonniere, Paris. Messageries Hachette et Cie, 111 Rue Reaumur, Paris. BELGIUM—W. H. Smith & Son 75, Boulevard Adolphe Max, Brussels. U.S.A.—The International News Co., New York, N.Y. CANADA—W. Dawson & Sons (Subscription Service) Ltd., Toronto, etc.; Imperial News Co., Ltd., Toronto, etc., Gordon & Gotch, Ltd., Toronto. AFRICA—Central News Agency Ltd., Cape Town, etc. W. Dawson & Sons (S.A.), Cape Town. INDIA—A. H. Wheeler & Co., Allahabad, Bombay, Calcutta, etc. AUSTRALASIA—Gordon & Gotch (A'sia), Ltd., Sydney, Melbourne, Adelaide, Brisbane, Perth, Launceston, Wellington, etc.